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September 29, 1987 Volume 1082 Number 5

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel for A Decision Without a Hearing as of Aug. 31, 1987.

Chemical Discipline	–	September 15, 1986
Mechanical Discipline	–	April 12, 1985
Electrical Discipline	–	June 12, 1985

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of Aug. 31, 1987.

Chemical	–	June 13, 1985
Electrical	–	December 1, 1985
Mechanical	–	October 1, 1985

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of Aug. 1987.

Affirmed	232
Affirmed-in-Part	35
Reversed	139
Total Decided	406

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that mainte-

nance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on September 25, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,472,835 through 4,473,906
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 12, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,392,262	06/312,715	7/12/83
4,392,268	06/330,687	7/12/83
4,392,273	06/393,247	7/12/83
4,392,275	06/246,694	7/12/83
4,392,284	06/284,899	7/12/83
4,392,286	06/229,940	7/12/83
4,392,306	06/268,582	7/12/83
4,392,311	06/289,764	7/12/83
4,392,312	06/311,484	7/12/83
4,392,315	06/338,960	7/12/83
4,392,318	06/302,363	7/12/83
4,392,320	06/373,263	7/12/83
4,392,322	06/290,483	7/12/83
4,392,325	06/302,982	7/12/83
4,392,327	06/275,194	7/12/83
4,392,328	06/280,358	7/12/83
4,392,339	06/324,814	7/12/83
4,392,348	06/290,138	7/12/83
4,392,350	06/246,665	7/12/83
4,392,369	06/246,178	7/12/83
4,392,389	06/299,078	7/12/83
4,392,395	06/226,273	7/12/83
4,392,398	06/268,401	7/12/83
4,392,407	06/296,737	7/12/83
4,392,408	06/276,823	7/12/83
4,392,410	06/279,644	7/12/83
4,392,413	06/222,148	7/12/83
4,392,420	06/353,337	7/12/83
4,392,430	06/285,445	7/12/83
4,392,434	06/233,192	7/12/83
4,392,440	06/253,800	7/12/83
4,392,443	06/236,404	7/12/83
4,392,446	06/251,464	7/12/83
4,392,455	06/278,044	7/12/83
4,392,457	06/221,718	7/12/83
4,392,466	06/386,273	7/12/83
4,392,477	06/258,633	7/12/83
4,392,480	06/393,066	7/12/83
4,392,484	06/273,287	7/12/83
4,392,488	06/267,388	7/12/83
4,392,499	06/269,261	7/12/83
4,392,527	06/239,895	7/12/83
4,392,529	06/317,750	7/12/83
4,392,532	06/244,085	7/12/83
4,392,547	06/272,502	7/12/83
4,392,558	06/251,706	7/12/83
4,392,569	06/339,598	7/12/83
4,392,578	06/313,833	7/12/83
4,392,598	06/340,750	7/12/83
4,392,609	06/226,558	7/12/83
4,392,613	06/218,676	7/12/83
4,392,624	06/232,094	7/12/83
4,392,628	06/285,490	7/12/83
4,392,637	06/300,903	7/12/83
4,392,641	06/302,970	7/12/83
4,392,645	06/268,007	7/12/83
4,392,648	06/266,925	7/12/83
4,392,649	06/276,030	7/12/83
4,392,653	06/316,752	7/12/83
4,392,659	06/234,895	7/12/83
4,392,662	06/277,259	7/12/83

Patent Number	Serial Number	Issue Date
4,392,663	06/274,671	7/12/83
4,392,665	06/254,454	7/12/83
4,392,675	06/226,346	7/12/83
4,392,679	06/263,759	7/12/83
4,392,684	06/239,031	7/12/83
4,392,685	06/228,160	7/12/83
4,392,690	06/242,015	7/12/83
4,392,692	06/282,515	7/12/83
4,392,711	06/245,720	7/12/83
4,392,737	06/324,098	7/12/83
4,392,754	06/347,716	7/12/83
4,392,755	06/347,649	7/12/83
4,392,760	06/386,512	7/12/83
4,392,761	06/251,039	7/12/83
4,392,767	06/236,399	7/12/83
4,392,794	06/220,271	7/12/83
4,392,800	06/230,586	7/12/83
4,392,802	06/316,776	7/12/83
4,392,806	06/311,358	7/12/83
4,392,810	06/222,752	7/12/83
4,392,816	06/239,553	7/12/83
4,392,817	06/239,554	7/12/83
4,392,818	06/247,832	7/12/83
4,392,819	06/228,522	7/12/83
4,392,820	06/220,827	7/12/83
4,392,822	06/268,810	7/12/83
4,392,824	06/306,152	7/12/83
4,392,830	06/315,496	7/12/83
4,392,832	06/276,075	7/12/83
4,392,833	06/294,480	7/12/83
4,392,847	06/260,964	7/12/83
4,392,853	06/244,000	7/12/83
4,392,863	06/335,759	7/12/83
4,392,866	06/318,532	7/12/83
4,392,873	06/272,964	7/12/83
4,392,875	06/347,949	7/12/83
4,392,883	06/237,093	7/12/83
4,392,890	06/354,347	7/12/83
4,392,895	06/319,159	7/12/83
4,392,904	06/225,009	7/12/83
4,392,921	06/217,318	7/12/83
4,392,925	06/257,891	7/12/83
4,392,926	06/265,347	7/12/83
4,392,945	06/346,173	7/12/83
4,392,946	06/330,108	7/12/83
4,392,952	06/255,883	7/12/83
4,392,957	06/281,932	7/12/83
4,392,976	06/391,590	7/12/83
4,392,996	06/282,910	7/12/83
4,392,999	06/301,807	7/12/83
4,393,004	06/344,118	7/12/83
4,393,014	06/302,946	7/12/83
4,393,024	06/332,312	7/12/83
4,393,039	06/301,075	7/12/83
4,393,054	06/379,528	7/12/83
4,393,057	06/371,400	7/12/83
4,393,065	06/249,762	7/12/83
4,393,069	06/324,680	7/12/83
4,393,073	06/371,621	7/12/83
4,393,074	06/338,476	7/12/83
4,393,100	06/295,462	7/12/83
4,393,101	06/387,580	7/12/83
4,393,120	06/294,030	7/12/83
4,393,137	06/276,425	7/12/83
4,393,141	06/352,070	7/12/83
4,393,146	06/380,070	7/12/83
4,393,174	06/319,614	7/12/83
4,393,175	06/300,621	7/12/83
4,393,216	06/275,619	7/12/83
4,393,217	06/224,606	7/12/83
4,393,220	06/249,323	7/12/83
4,393,233	06/337,900	7/12/83
4,393,236	06/282,419	7/12/83
4,393,242	06/280,623	7/12/83
4,393,266	06/412,448	7/12/83
4,393,268	06/265,325	7/12/83
4,393,284	06/322,755	7/12/83
4,393,300	06/316,056	7/12/83
4,393,394	06/293,525	7/12/83
4,393,395	06/300,226	7/12/83
4,393,425	06/248,809	7/12/83
4,393,427	06/220,197	7/12/83
4,393,434	06/323,586	7/12/83
4,393,437	06/284,095	7/12/83
4,393,487	06/328,550	7/12/83
4,393,489	06/248,776	7/12/83
4,393,509	06/252,737	7/12/83

Notification of Acceptance of Delayed Payment of Maintenance Fee
(35 U.S.C. 41(c);37 CFR 1.378)

The patents listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenace fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,383,139	06/239,346	5/10/83	3/2/81	8/27/87
4,371,295	06/245,454	2/1/83	3/19/81	9/2/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicatedExamining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,176,316, Re. S.N. 004,369, Filed Jan. 15, 1987, Cl. 380/32, SECURE SINGLE SIDEBAND COMMUNICATION SYSTEM USING MODULATED NOISE SUBCARRIER, Louis A. DeRosa, et al., Owner of Record: *International Telephone & Telegraph Corp., Nutley, N.J.,* Attorney or Agent: Paul W. Hemminger, et al., Ex. Gp.: 222

4,408,616, Re. S.N. 084,700, Filed Aug. 7, 1987, Cl. 128/731, BRAIN ELECTRICAL ACTIVITY MAPPING, Frank H. Duffy, et al., Owner of Record: *Children's Medical Center Corp., Boston, Mass.,* Attorney or Agent: David E. Brook, et al., Ex. Gp.: 335

4,496,806, Re. S.N. 008,431, Filed Jan. 29, 1987, Cl. 200/16R, ELECTRIC CONTACT SWITCHING DEVICE, Kozo Maenishi, et al., Owner of Record: *Omron Tateisi Electronics Co., Kyoto, Japan,* Attorney or Agent: Barry E. Bretschneider, et al., Ex. Gp.: 214

4,501,965, Re. S.N. 084,670, Filed Aug. 7, 1987, Cl. 253/288, METHOD AND APPARATUS FOR SAMPLING A PLASMA INTO A VACUUM CHAMBER, Donald James Douglas, Owner of Record: *Donald James Douglas, Ontario, Canada,* Attorney or Agent: Charles A. Laff, et al., Ex. Gp.: 256

4,534,713, Re. S.N. 084,424, Filed Aug. 10, 1987, Cl. 417/377, PUMP APPARATUS, William F. Wanner, Owner of Record: *Recovery Engineering, Inc., Minneapolis, Minn.*, Attorney or Agent: Curtis B. Hamre, et al., Ex. Gp.: 343

4,546,048, Re. S.N. 047,238, Filed May 7, 1987, Cl. 428/460, COMPOSITE THERMAL SHIELD FOR ENGINE COMPONENTS, William D. Guenthers, Owner of Record: *Dana Corp., Toledo, Ohio,* Attorney or Agent: Robert M. Leonard, et al., Ex. Gp.: 154

4,564,019, Re. S.N. 044,066, Filed Apr. 29, 1987, Cl. 128/660, METHOD FOR MEASURING CHARACTERISTICS OF LIVING TISSUES BY ULTRASONIC WAVES, Hidrohide Miwa, Owner of Record: *Fujitsu Ltd., Kanagawa, Japan,* Attorney or Agent: James D. Halsey, Jr., Ex. Gp.: 335

4,567,971, Re. S.N. 085,837, Filed Aug. 17, 1987, Cl. 192/012, HYDRAULIC CIRCUIT FOR ACTIVATING A CLUTCH AND A THROTTLE VALVE USED IN THE CIRCUIT, Hans-Jorg Hille, Owner of Record: *Deere Co., Moline, Ill.,* Attorney or Agent: John M. Nolan, et al., Ex. Gp.: 352

4,610,733, Re. S.N. 076,051, Filed June 8, 1987, Cl. 148/12.7A, HIGH STRENGTH WELDABLE ALUMINUM BASE ALLOY PRODUCT AND METHOD OF MAKING SAME, Robert E. Sanders, Jr., et al., Owner of Record: *Aluminum Co. of America, Alcoa, Pa.,* Attorney or Agent: Andrew Alexander, et al., Ex. Gp.: 111

4,626,118, Re. S.N. 084,554, Filed Aug. 12, 1987, Cl. 401/104, WRITING INSTRUMENT WITH FASTENING MEANS, Roger T. Bellavance, Owner of Record: *Inventor,* Attorney or Agent: David S. Fishman, Ex. Gp.: 332

4,635,287, Re. S.N. 084,031, Filed Aug. 10, 1987, Cl. 381/194, AUDIO-FREQUENCY ELECTROMECHANICAL VIBRATOR, Mutsuo Hirano, Owner of Record: *Sanden Corp., Isesaki-Shi, Japan,* Attorney or Agent: Roy C. Hopgood, et al., Ex. Gp.: 261

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,121,818, Reexam. No. 90/001,302, Requested: Aug. 6, 1987, Cl. 270/54, SIGNATURE COLLATING AND BINDING SYSTEM, Wayne A. Riley, et al., Owner of Record: *R. R. Donnelley & Sons Co., Chicago, Ill.,* Attorney or Agent: Wood, Dalton, et al., Ex. Gp.: 330, Requester: Owner

4,252,576, Reexam. No. 90/001,306, Requested: Aug. 10, 1987, Cl. 148/33.400, EPITAXIAL WAFER FOR USE IN PRODUCTION OF LIGHT EMITTING DIODE, Shinichi Hasegawa, et al., Owner of Record: *Mitsubishi Monsanto Chemical Co., Tokyo, Japan,* Attorney or Agent: Fitzpatrick, Cella, et al., Ex. Gp.: 110, Requester: Owner

4,349,987, Reexam. No. 90/001,305, Requested: Aug. 7, 1987, Cl. 46/265, DOLL WHICH RISES FROM PRONE TO STANDING POSITION, Philip D. Bart, Owner of Record: *Inventor, Coral Springs, Fla.,* Attorney or Agent: Daniel M. Rosen, Ex. Gp.: 330, Requester: Kenner Products, Inc., Cincinnati, Ohio

4,389,074, Reexam. No. 90/001,308, Requested: Aug. 17, 1987, Cl. 299/79, MINE TOOLS UTILIZING COPPER-MANGANESE NICKEL BRAZING ALLOY, Mark S. Greenfield, Owner of Record: *GTE Products Corp., Stamford, Conn.,* Attorney or Agent: D. R. Castle, Ex. Gp.: 320, Requester: Kennametal, Inc., Latrobe, Pa.

4,503,095, Reexam. No. 90/001,303, Requested: Aug. 7, 1987, Cl. 427/359, HEAT-SENSITIVE COLOR TRANSFER RECORDING MEDIA, Tadao Seto, et al., Owner of Record: *Fuji Kagakushi Kogyo Co., Osaka, Japan,* Attorney or Agent: R. J. Kubovcik, Ex. Gp.: 130, Requester: J. J. Brown, Rockville, Md.

4,595,627, Reexam. No. 90/001,304, Requested: Aug. 17, 1987, Cl. 428/241, FLUORESCENT TEXTILE MATERIAL, Barry Steinman, Owner of Record: *Safety Trim Industries, Inc., New York, N.Y.,* Attorney or Agent: Temko & Temko, Ex. Gp.: 150, Requester: Fitzpatrick, Cella, et al., New York, N.Y.

4,599,366, Reexam. No. 90/001,300, Requested: Aug. 3, 1987, Cl. 521/57, ANTI-STATIC STYRENE POLYMER PARTICLES, Haven S. Resling, Jr., et al., Owner of Record: *Atlantic Richfield Co., Newtown Square, Pa.,* Attorney or Agent: John C. Martin, Ex. Gp.: 150, Requester: Owner

4,609,561, Reexam. No. 90/001,301, Requested: July 27, 1987, Cl. 426/565, FROZEN AERATED FRUIT JUICE DESSERT, Bill R. Wade, et al., Owner of Record: *Olympus Industries, Inc., Spokane, Wash.,* Attorney or Agent: E. W. Oldham, Ex. Gp.: 130, Requester: Christensen, O'Connor, et al., Seattle, Wash.

4,610,077, Reexam. No. 90/001,307, Requested: Aug. 17, 1987, Cl. 29/572, PROCESS FOR FABRICATING A WRAPAROUND CONTACT SOLAR CELL, Joseph A. Minahan, et al., Owner of Record: *Hughes Aircraft Co., Los Angeles, Calif.,* Attorney or Agent: J. E. Holman Ex. Gp.: 110, Requester: Owner

4,662,875, Reexam. No. 90/001,309, Requested: Aug. 17, 1987, Cl. 604/389, ABSORBENT ARTICLE, Dennis O. Hirotsu, et al., Owner of Record: *The Procter & Gamble Co., Cincinnati, Ohio,* Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Owner

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Erratum

"All reference to Patent No. 4,679,288 to Guy Monfort, et al., of Braives, Belgium, for 'SURFACE TREATMENT OF A ROLLING MILL ROLL', appearing in the Official Gazette of July 14, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,679,907 to Bruce D. Campbell, et al., of Calif., for 'METHODS, APPARATUS AND ARTICLES FOR OPTICAL FIBER SYSTEMS', appearing in the Official Gazette of July 14, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,680,322 to Yuzo Yokota, et al., of Japan, for 'COMPOSITION FOR FORMING A LAYER OF THE SUPPORTING PLATE FOR USE IN LITHOGRAPHY AND PROCESS FOR PRODUCING THE COMPOSITION', appearing in the Official Gazette of July 14, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,684,410 to Alpha L. Morehouse, of Iowa, for 'LOW D.E. STARCH HYDROLYZATES', appearing in the Official Gazette of Aug. 4, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,689,088 to Alpha L. Morehouse, of Iowa, for 'LOW D.E. STARCH HYDROLYZATES', appearing in the Official Gazette

of Aug. 25, 1987, should be deleted since no patent was granted."

Errata

The following registration numbers, listed in the "Trademark Registrations Issued" section of the Trademark Official Gazette of Aug. 25, 1987, were listed inadvertently:

1,454,058	TM 156	Aug. 25, 1987
1,454,480	TM 164	Aug. 25, 1987

Consequently, the certificates of registration bearing the above-identified registration numbers were not issued on the date indicated, and the registration numbers have been vacated.

PATRICIA M. DAVIS,
Sept. 1, 1987. *Administrator for Trademark Operations.*

Errata

The following registration number, listed in the "Trademark Registrations Issued" section of the Trademark Official Gazette of Dec. 11, 1984, was listed inadvertently:

1,309,437	TM 394	Dec. 11, 1984

Consequently, the certificate of registration bearing the above-identified registration number was not issued on the date indicated, and the registration number has been vacated.

PATRICIA M. DAVIS,
Sept. 1, 1987. *Administrator for Trademark Operations.*

Department of Commerce
Patent and Trademark Office
[Docket No. 70470-7070]

Electronic Data Dissemination Policies and Guidelines

Correction

In notice document 87-19056 beginning on page 31442 in the issue of Thurs., Aug. 20, 1987, make the following corrections:

On page 31443, in the first column, under **SUPPLEMENTARY INFORMATION**, in the second paragraph, in the sixth line, "not will" should read "not nor will".

2. On the same page, in the second column, under **Background**, in the fourth paragraph, in the fifth line, "relected" should read "selected".

3. On the same page, in the third column, in the fourth line, "patent" should read "patents".

BILLING CODE 1505-01-D

Adverse Decisions in Interference

In the designated interferences involving the following patent, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 4,200,520, Elroy M. Gladrow and William E. Winter, CATALYTIC CRACKING PROCESS, Interference No. 101,160, decided Mar. 31, 1987, claims 1-9.

NANNIE B. HENRY,
Deputy Clerk,
Board of Patent Appeals and Interferences.

Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,026,819, Ronald Francis Langere, Otto Ernest Loeffler and Thomas Francis Santini, PRODUCTION OF HYDROUS PENTAVALENT ANTIMONY OXIDE SOL COMPOSITION, DRY POWDER PREPARED THEREFROM, AND PRODUCTION OF SAID DRY POWDER, Interference No. 101,703, decided July 31, 1987, claims 1-4.

Patent No. 4,130,588, Alton E. Martin, Warren D. White and Samuel L. Smolik, PROCESS FOR PRODUCING METHYLENE DIANILINE, Interference No. 101,693, decided July 15, 1987, claims 1-10.

Patent No. 4,200,745, Allen S. Katner, 7[2-(2-AMINOTHIOZOL-4-YL)-2-ALKOXYIMINO]ACETAMIDO 3[4-ALKYL-5-OXO-6-HYDROXY-3,4 DIHYDRO 1,2,4-TRIAZIN-3-YL] THIOMETHYL CEPHALOSPORINS, Interference No. 101,677, decided July 7, 1987, claims 1-12.

Patent No. 4,233,308, Walter Kunz, Wolfgang Eckhardt and Adolf Hubele, MICROBICIDAL COMPOSITIONS, Interference No. 101,722, decided July 14, 1987, claims 1-9.

Patent No. 4,454,756, Harper E. Sharp, Leo Spiegel, Richard M. Masters, Elmer J. Frey, John R. Howatt and Gary E. Walker, INERTIAL BOREHOLE SURVEY SYSTEM, Interference No. 101,351, decided Aug. 6, 1987, claims 13-15, 20-22, 24-26, 29, 30, 32 and 33.

Patent No. 4,469,979, Shih S. Chuang, MICRORESONATOR OF DOUBLE-ENDED TUNING FORK CONFIGURATION, Interference No. 101,559, decided July 22, 1987, claim 11.

Patent No. 4,470,983, Jurgen Blumbach, Walter Durckheimer and Karl Seeger, CEPHALOSPORIN DERIVATIVES, Interference No. 101,774, decided July 23, 1987, claims 1-4.

Patent No. 4,481,275, Masahide Iseki, Tadanobu Nakajima, Hiroshi Kajita and Masuo Kawamoto, METHOD OF PREVENTING TONER FROM SCATTERING IN AN ELECTROSTATIC COPYING MACHINE, Interference No. 101,519, decided Mar. 31, 1987, claims 1-3.

Patent No. 4,498,966, Alton T. Tabereaux, ALUMINA REDUCTION CELL, Interference No. 101,711, decided July 16, 1987, claims 1-6.

Patent No. 4,532,215, Richard J. Daemer, Stephen M. Feinstone, Ian D. Gust and Robert H. Purcell, ISOLATION OF HEPATITIS A VIRUS STRAIN HM-175, Interference No. 101,583, decided July 13, 1987, claims 1-3.

Patent No. 4,553,035, Igor Malinsky, Jose B. Cofino and Richard J. McKay, DATA ACQUISITION CONTROL METHOD AND SYSTEM FOR A HAND HELD READER, Interference No. 101,558, decided July 1, 1987, claims 1-17.

Patent No. 4,599,333, Kikuo Yasuda, Takayuki Takezaki, Rikio Ohuchi, Hiroshi Ohuyabu, Yoshitaka Tanimoto, Toshimi Seki, Takashi Yamaguchi, Akihiro Izumi, Norio Himori and Tsutomu Ishimori, HYDRAZINOPYRIDAZINE COMPOUND, PROCESS FOR PRODUCTION THEREOF, AND USE THEREOF AS MEDICAMENT, Interference No. 101,791, decided July 14, 1987, claims 1-11.

NANNIE B. HENRY,
Deputy Clerk,
Board of Patent Appeals and Interferences.

Status of PTO Services

The following is an update of the status of PTO services for August 1987:

Service Item	FY 1987 Goal (Calendar Days*)	Monthly Average (Calendar Days*)
Filing Receipts:		
Patents	22	31
Trademarks	30	59**
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	14 Hours
Window Coupons	5	1
Mail Coupons	12	4
Letter Orders	16	9
Certified Copies:		
Trademark Registrations	21	23
Applications-As-Filed	17	15***
File-Wrapper/Contents	N/A	24
Walk-up Certification	1	2
Trademark Search Library:		
Filing Pending Marks	21	45**
Filing Reg. Certificates	Issue Date	Issue Date
Assignments:		
Patents	20	38 (see narrative)
Trademarks	20	47 (see narrative)
Receipt Date of Trademark Documents Returned		July 31, 1987
Receipt Date of Patent Documents Returned		July 17, 1987
Avg. Days from Issue Fee Payment to Issue Date	90–100	87
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On schedule
Patent Copies Available	95% on Issue Date	86% on Issue Date****
Trademark Copies Available	95% on Issue Date	98% on Issue Date

* Unless otherwise noted.
** Keying contractor delays.
*** The 5% of orders for which fiche are not on site are not included in calculations.
**** Printer delivered copies late.

IMPROVEMENTS TO SERVICES

- Until June 1987, trademark assignments containing more than 99 properties were pulled from the normal processing pipeline and handled separately. This was being done since the automatic typewriters used to record the information must be reset to accommodate for more than 99 properties. However, this procedure had resulted in delays in recording such assignments, and in their being processed well after other assignments with earlier receipt dates. An intensive effort has been underway to record all those assignments and the backlog has now been completed. All trademark assignments, regardless of the number of properties, are now being processed in date order and we are planning to be back on schedule by the end of Sept.

  Similarly, patent assignments involving several properties had also been delayed. The increase in the days to process assignments reflects the working off of this backlog. It is expected to be completed by the end of Sept. and all patent assignments should be back on target in Oct.

HELPFUL HINTS

- *Certificate of Mailing AND Return Post Card* — Use of the Certificate of Mailing Procedure is strongly encouraged.

  37 CFR 1.8(a) provides for the use of a Certificate of Mailing on most correspondence with the PTO, whereby the correspondence (and/or fee) will be considered as timely filed if deposited with the U.S. Postal Service within the set time period. Consistent use of this procedure is extremely beneficial to practitioners, whether or not the Post Card Receipt provision of MPEP 503 is used.

  In those instances where the PTO never receives the correspondence, no post card receipt will be available to evidence the filing and/or timeliness of the correspondence. However, in those instances where a Certificate of Mailing is properly used, 37 CFR 1.8(b) provides relief, even if the correspondence is *not* received in the PTO at all. Under 37 CFR 1.8(b) the party who forwarded the correspondence need only (1) inform the PTO of the previous mailing of the correspondence, (2) supply a copy of the previously mailed correspondence and Certificate, and (3) include a declaration which adequately attests to the previous timely mailing.

Sept. 8, 1987.

THERESA A. BRELSFORD,
Assistant Commissioner
for Administration.

PATENT NOTICES

Certificates of Correction for the Week of Sept. 29, 1987

D. 290,329	4,631,679	4,656,268	4,664,827
4,393,875	4,634,855	4,656,400	4,665,219
4,482,825	4,636,378	4,657,305	4,665,816
4,485,099	4,637,706	4,657,377	4,665,895
4,504,771	4,640,135	4,657,645	4,665,909
4,507,763	4,640,655	4,657,683	4,666,253
4,514,212	4,642,100	4,658,121	4,666,734
4,516,968	4,642,118	4,658,706	4,666,813
4,518,574	4,643,192	4,659,016	4,667,056
4,519,137	4,644,296	4,659,074	4,667,063
4,520,617	4,644,457	4,659,225	4,667,153
4,529,455	4,646,681	4,659,739	4,667,590
4,531,563	4,646,790	4,659,877	4,668,232
4,557,550	4,648,037	4,660,342	4,668,240
4,573,169	4,648,358	4,660,371	4,668,396
4,575,554	4,648,572	4,660,853	4,669,722
4,576,629	4,648,963	4,661,165	4,669,974
4,583,592	4,649,144	4,661,271	4,670,630
4,586,291	4,649,641	4,661,442	4,670,733
4,591,762	4,650,464	4,661,837	4,670,949
4,602,655	4,651,071	4,662,041	4,671,083
4,604,619	4,652,197	4,662,072	4,673,742
4,608,061	4,652,318	4,662,430	4,673,990
4,610,521	4,653,438	4,663,014	4,674,031
4,612,319	4,653,500	4,663,100	4,676,630
4,613,379	4,654,100	4,663,243	4,676,944
4,619,712	4,654,351	4,663,734	4,678,293
4,627,072	4,654,848	4,663,837	4,678,440
4,627,348	4,654,946	4,664,760	4,678,624

Disclaimers

4,623,583.—*Vladimir Mischutin*, Union City N.J. FLAME RETARDANT TEXTILE FABRICS. Patent dated Nov. 18, 1986. Disclaimer filed July 13, 1987, by the assignee, *White Chemical Corp.*

The term of this patent subsequent to Apr. 15, 1992, has been disclaimed.

4,645,588.—*Waldeen C. Buss*, Kensington and *Thomas R. Hughes*, Orinda, Calif. REFORMING WITH A PLATINUM-BARIUM-ZEOLITE OF L FAMILY. Patent dated Feb. 24, 1987. Disclaimer filed Aug. 13, 1987, by the assignee, *Chevron Research Co.*

The term of this patent subsequent to Jan. 6, 2004, has been disclaimed.

4,658,583.—*David C. Shropshire*, Lafayette, Ind. DOUBLE STAGED, INTERNAL ROTARY PUMP WITH FLOW CONTROL. Patent dated Apr. 21, 1987. Disclaimer filed July 13, 1987, by the assignee, *TRW, Inc.*

Hereby enters this disclaimer to claims 1–4, 10 and 11 of said patent.

Disclaimers and Dedications

4,368,351.—*Scott E. Zimmer*, Fairfield, Conn. AMPLITUDE MODULATED DIGITIZER. Patent dated Jan. 11, 1983. Disclaimer and Dedication filed June 25, 1987, by the assignee, *Summagraphics Corp.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,598,505.—*Jack A. McGown*, Houston, Tex. FLASHING MEMBER. Patent dated July 8, 1986. Disclaimer and Dedication filed June 19, 1987, by the *inventor.*

Hereby disclaims and dedicates to the Public all claims of said patent.

DEPARTMENT OF COMMERCE

Patent and Trademark Office

37 CFR Part 1

[Docket No. 70635-7135]

Deposit of Biological Materials for Patent Purposes

AGENCY: Patent and Trademark Office, Commerce.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: This advanced notice of proposed rulemaking sets forth proposed rules and guidelines that the Patent and Trademark Office (PTO) is considering to govern the deposit of biological materials for patent purposes.

Every patent must contain a written description of the invention adequate to instruct a person skilled in the art to which the invention pertains how to make and use the invention. In certain instances, such as with some biotechnological inventions, the written description of the invention may not in itself be adequate to permit reproduction of the invention. In these cases, the written description must be supplemented by a deposit of the biological material which constitutes the invention or on which the invention depends if the biological material is not otherwise known and readily available to those skilled in the art. The deposited material becomes unconditionally available to the public at the time the patent is granted.

The rules being considered for proposal by the PTO prescribe the conditions under which a deposit must be made, the kinds of materials that may be deposited, the type of depository which is acceptable to the Office, the time for making an original deposit, the procedures and obligations applicable to the making and maintaining of a deposit and its possible replacement, the term of a deposit and other matters relating to the deposit of a biological material. In general, the rules being considered by the PTO would continue and clarify both long-standing practices of the Patent and Trademark Office and judicially developed principles of patent law. The explanations associated with the rules that are ultimately adopted along with the substantive content of the comments and responses will be incorporated into a set of guidelines that will be published in the Manual of Patent Examining Procedure.

In response to a draft policy statement on the deposit of biological materials for patent purposes, which was circulated among interested bar and industry groups and published in the BNA-Patent, Trademark and Copyright Journal on May 22, 1986, the PTO received twenty five (25) written comments directed to that draft statement. This advance notice addresses the comments received. Interested persons are invited to comment on the rules being considered for proposal. A proposed rulemaking could be made as early as January 1988. A hearing could be held as early as March 1988.

DATE: Comments must be received on or before November 30, 1987 to insure consideration.

ADDRESS: Address written comments to: Commissioner of Patents and Trademarks, Box 4, Washington, DC 20231.

Mark to the attention of Stanley D. Schlosser (703) 557-3065. All comments received will be publicly available for inspection in the PTO in room 11C28, Crystal Plaza Building 3 (2021 Jefferson Davis Highway, Arlington, Virginia).

FOR FURTHER INFORMATION CONTACT: Mr. Stanley D. Schlosser by telephone at (703) 557-3065.

SUPPLEMENTARY INFORMATION: An applicant for a patent involving biological material must meet the same requirements for disclosing the invention as apply to other kinds of technology. These requirements are set forth in the first paragraph of § 112 of the patent law (Title 35, United States Code). The invention must be described in such full, clear, concise and exact terms as to enable a person skilled in the relevant technology to make and use the invention. The best mode contemplated by the inventor for carrying out the invention must also be disclosed. The statutory requirements for claiming inventions set forth in the second paragraph of 35 U.S.C. 112 also apply to inventions involving biological material. That is, claims must particularly point out and distinctly claim that which applicants for patent regard as their invention.

Where the invention involves a biological material and words alone are not sufficient to describe the invention adequately to meet the requirements of 35 U.S.C. 112, the required biological material completing the written description must either already be known and readily available and likely to continue to be available or be deposited into a suitable depository. Samples of the deposited material must be publicly and unconditionally available upon issuance of the patent. The deposit will be considered part of the patent disclosure and taken into account in determining the scope of the invention and related questions of infringement. As indicated above, the requirement for making a deposit only applies in situations where the biological material is essential to a complete disclosure and either is not known and readily available to the public, or cannot be readily produced from publicly available material according to the information contained in the patent.

A new chapter of rules of practice devoted exclusively to biological inventions, entitled "Deposit of Biological Materials for Patent Purposes", would be added, beginning with proposed new rule 1.200. This new chapter would specifically incorporate into patent practice judicially developed principles applicable to the deposit of biological materials and would be consistent with the duties and responsibilities of the United States as a signatory country to the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. It must be recognized, however, that a comprehensive body of patent law has not yet been developed by the courts dealing with the treatment of inventions relating to biological material. In situations where the courts have not provided specific guidance, appropriate rules and procedures are extracted or implied as far as possible from available decisions and existing practices.

The rules being considered for proposal are intended to apply to patent rights pursued under section 101 of the patent law (Title 35, United States Code). Patent applications filed under the Plant Patent Act (35 U.S.C. 161-164) would be unaffected by this advanced notice. However, comments are solicited on the question of whether the Office should consider requiring a deposit of plants in appropriate circumstances where it is clear that a deposit is possible and is necessary to complete the description of an invention under 35 U.S.C. 162, first paragraph.

New rule 1.200 would be proposed to define the nature of biological material that falls within the scope of the rules. The definition is not intended to provide an exhaustive list of materials which may be deposited in accordance with these procedures. Rather, the need for a deposit and the types of material which must be deposited will be developed through experience and judicial decisions. Meanwhile, some guidelines can be provided.

First, biological material includes material that is capable of self-replication, either directly or after insertion into a host. Assuming the continued viability of the samples

deposited, this should provide a reproducible supply of the biological material for the term of the deposit.

Chemical compounds, no matter how important or defined their biological activity, are not regarded as biological material within the scope of these regulations. Chemical compounds are capable of description at least through the identification of starting materials and explanation of appropriate procedures used in making the compounds. It must not require undue experimentation in order to make or use the chemical compound from the written description in the patent application. Thus, materials such as proteins, enzymes, or other complex organic materials need not be deposited where the written description alone is adequate to enable those skilled in the art to make and use the claimed invention.

Plant material must be deposited when the patent application is filed outside the Plant Patent Act if needed to meet the requirements of 35 U.S.C. 112. As with other biological material, the deposit of plant material together with the written specification must enable those skilled in the art to make and use the claimed invention. Thus, if a plant itself is claimed, deposit of plant cells can be accepted only if the deposited cells will develop into the plant for which a patent is sought through the exercise of procedures either known in the art or taught in the application disclosure. Seeds may be deposited, but must be deposited in sufficient quantity to insure an adequate and timely supply once a patent is granted. The PTO solicits comments on the setting of an appropriate minimum number of seeds to ensure availability of the seed through the enforceable life of the patent. The replacement provisions of proposed rule 1.204 would also apply to replenishing the supply of seeds but may require special provisions because of the time required to provide new seeds—e.g. the replacement provision could be coupled with a terminal disclaimer provision for appropriate reasons. If a hybrid variety is claimed, the PTO will take a position that applicant must deposit the parent lines of the hybrid variety unless applicant is able to establish that propagation of the variety can be achieved by micropropagation or other techniques from the hybridized seed or plants grown from such seed. In the latter case, the deposit of the hybrid seed itself would make an adequate deposit.

While the proposed rules under consideration would be applicable to multicellular living organisms other than plants, including animals, it is anticipated that inventions relating to the development of animals having new and otherwise patentable characteristics will rely on the identification and description of a known and readily available animal that will be treated in a reproducible process to obtain the new animal variety. The PTO is presently not aware of any organization that is willing and able to undertake the responsibilities of a suitable depository for live animals.

Rule 1.201 would be proposed to provide an operative definition of when a deposit is required and also define when a biological material would be considered to be known and readily available to the public so that a separate deposit would not be required. The third paragraph of this rule would provide that there is no presumption that a specific biological material is required for the practice of an invention simply because it is mentioned in an application disclosure. The need to make a deposit of a biological material in accordance with these rules is necessitated only where the biological material is essential to meet one or more of the requirements of 35 U.S.C. 112 and is not known and readily available and cannot be obtained through procedures known in the art or described in the application from known and readily available materials.

If a biological material is known and readily available at the time the patent is granted, and there is no reasonable basis to believe that the biological material will cease to be available during the life of the patent, no requirement for a separate deposit would be made.

While it is not possible to list all circumstances under which a biological material may be considered to be known and readily available to the public, it is clear that the written description in the specification should be sufficient to allow one of ordinary skill in the art to identify and to obtain the known and readily available material. The present commercial availability of the biological material through normal commercial suppliers, particularly suppliers not under the control of those relying on the availability of the biological material, would make the material known and readily available. The mere fact that the biological material is commercially available only through the patent holder or the patent holder's agents or assigns shall not by itself justify a finding of non-availability, absent a reason to believe that access to the biological material would later be improperly restricted. Since the public has a continuing interest in the availability of information and materials necessary to make and use an invention claimed in a patent, regardless of the patent holder's interest, actual distribution of the biological matter in the marketplace may be required if commercial availability is to be relied on to establish that a specific biological material is known and readily available to the public.

Evidence that a biological material is known and readily available may also take the form of a reference in printed publications or a declaration of accessibility by those working in the field to which the invention relates which establishes wide distribution and ready availability of the biological material. The probative value of this type of evidence will depend on whether the evidence establishes that the biological materials are known and accessible without restriction to those who desire to obtain and test the biological material.

Evidence that a biological material is known and readily available may take the form of a statement showing that it is readily identifiable and available in nature in useful form or that it is available in nature coupled with the existence of a reliable screening test or procedure defined in the specification disclosure or known to those skilled in the art that could be used to isolate the required biological material with reasonable predictability from an identified genus of biological material. See *Tabuchi v. Nubel*, 194 USPQ 521 (CCPA 1977). A deposit made of a biological material that was known and accessible without restriction to those who desired to obtain and test the biological material would also satisfy the definition of being known and readily available to the public. However, since a mere reference to a biological material deposit in a patent would not necessarily mean that it was accessible without restriction to the public the burden would be on the applicant to establish its ready availability without restriction as through a statement from the depository.

New rule 1.202 would be proposed to define an acceptable depository for the deposit of biological materials for patent purposes for applications before the United States Patent and Trademark Office. This rule states that a deposit may be made either in an International Depositary Authority (IDA) as established under the Budapest Treaty or a depository recognized to be suitable by the Patent and Trademark Office. The depository may be domestic or

foreign to the United States, public or private. While it would be administratively convenient for the Patent and Trademark Office to limit acceptable depositories to an IDA, such a restricted policy would not provide a patent applicant with the type of flexibility and availability necessary in the event no available IDA would accept a deposit of a particular biological material. Nevertheless, a depository other than an IDA would be called upon to essentially establish compliance with the administrative and technical requirements set forth in the Budapest Treaty for IDAs in order to establish suitability of the depository to the Office. While there is a desire to provide flexibility to a patent applicant in selecting an appropriate depository, these guidelines are not intended to permit each patent applicant to become its own depository since both the patent owner and the public have an interest in the continued availability and accessibility of the deposit during the enforceable life of a patent and the public has a continuing interest in its availability when the patent is no longer enforceable.

Paragraph (c) of new rule 1.202 indicates that the Office will recognize the transfer of a sample to a suitable depository from a depository which either defaults or discontinues the performance of any of the tasks it should perform. Where such a transfer takes place after a patent issues, a suitable Certificate of Correction would be acceptable to identify the new depository and/or accession number. An appropriate amendment to a pending application to identify the new depository and/or accession number would not constitute new matter. Cf. *In re Lundak*, 227 USPQ 90 (Fed. Cir. 1985).

Paragraph (d) of new rule 1.202 sets forth the procedure for notifying the Commissioner of the intent to be recognized as a suitable depository by the Patent and Trademark Office. The depositories recognized as suitable by the Office will be published in the Official Gazette of the Patent and Trademark Office as will the identity of a depository which has defaulted or discontinued its performance under these rules.

New rule 1.203 would be proposed to set forth the time for making an original deposit. An original deposit may be made at any time before the application is filed or during pendency pursuant to a requirement that will be made no later than the date the Notice of Allowance and Issue Fee Due is mailed. The decision in *Lundak* indicated that a specification disclosure need not be enabling until such time as a patent is granted. Unless the examiner and applicant agree on whether a deposit is required, what must be deposited and the appropriate conditions, the deposit issues will be resolved pursuant to a rejection under 35 U.S.C. 112. The time specified in this particular rule for making a suitable deposit is the last practical moment that the Office can insure that a deposit has been made in accordance with these regulations before a patent is granted. After the issue fee is paid in an application the application undergoes preparation for printing for a period of 8 to 10 weeks so that all the information necessary for printing should be in the application file and should have been approved by the examiner as conforming to these regulations at the time the issue fee is paid. Where a deposit is made after the Notice of Allowance and Issue Fee Due is mailed, applicant would be required to file an amendment under 37 CFR 1.312 to add a description of the accession number and depository together with any required statement.

Unless the regular deposit is made before the effective filing date of an application for patent in the United States, a verified statement will be required from a person in a position to corroborate that the biological material described in the application as filed is the same biological material which is deposited in a suitable depository. The nature of this corroboration will depend on the circumstances in the particular application under consideration including the length of time between the application filing date and the date of deposit.

New rule 1.204 would be proposed to define the circumstances and procedures for replacing a deposit which is necessary for patent purposes. Failure to replace a deposit within three (3) months after learning or receiving notice from a depository that a replacement is needed may cause the application or patent involved to be treated by the PTO as if no deposit were made. The Patent and Trademark Office will apply a rebuttable presumption of an identity between the original and the replaced sample in the event a deposit is replaced where the application or patent making reference to the deposit is relied upon during any Patent and Trademark Office proceeding.

New rule 1.205 would be proposed to define the term of a deposit to be a minimum of 5 years after the most recent request for the furnishing of a sample of the deposited biological material and at least 30 years after the date of deposit. Any deposit which is made pursuant to the Budapest Treaty will be for a term acceptable to the Office. However, where a deposit is not made under the Budapest Treaty, samples must be stored under an agreement that would make them available for at least the term specified in the Budapest Treaty so long as it extended beyond the enforceable life of the patent for which a deposit was made. The enforceable life of a patent includes the original term of seventeen years, shortened by any terminal disclaimer or lengthened by any patent term extension, plus six (6) years to cover the statute of limitations and any additional time beyond this period where the enforceability of the patent remains in litigation.

The period for storing a deposit as literally stated in the Budapest Treaty is likely to cover almost all of the circumstances before the Patent and Trademark Office. However, in the event that the period of storage would expire before the earliest possible expiration date of the enforceable life of the patent, one of the basic intents of Congress to insure that the public can practice the invention claimed in an expired patent may be frustrated, and it is not believed that the period set forth in the Budapest Treaty intended for such a situation to arise. The availability of the deposited biological material which is essential for making and/or using the subject matter claimed in the patent is a legitimate ground for concern on the part of the Patent and Trademark Office. *Ex parte Lundak* (decided August 21, 1984, reversed on other grounds *In re Lundak*, 227 USPQ 90 (Fed. Cir. 1985)). The Board of Patent Appeals considered the possibility that an initially enabling disclosure might become non-enabling over a period of time. *In re Metcalfe*, 410 F2d. 1378, 161 USPQ 789 (CCPA 1969). Suggesting that a rule of reason approach similar to that applied by the Court in *Metcalfe* should continue to inhere in the deposit procedure of the Patent and Trademark Office, the Board suggested that it was appropriate to insist that the depository be contractually obligated to maintain the deposit for at least a reasonable time after expiration of the patent rights. In determining whether the period is sufficient to extend beyond the enforceable life of the patent, neither the possibility of patent term extension nor the possibility of protracted litigation will be considered. Where the minimum period of storage would not extend beyond the enforceable life of the patent, as where there is prolonged pendency of an application or continuation or divisional applications

are involved, one approach would be to require applicant to undertake to request a sample every five years beyond the 30 years measured from the date of deposit so that the deposit would be stored for a period beyond the enforceable life of the patent.

A non-viable deposit cannot be relied upon to supplement a written description in a patent application. Experience has shown that as many as 10% of the deposits made with American Type Culture Collection (ATCC) on which a viability test was conducted were not viable when received at the depository. The requirement for verification of the viability of deposits is consistent with the Budapest Treaty and is a subject of proposed new rule 1.206.

The viability of a deposit made under the Budapest Treaty is a requirement. Thus, a mere statement by applicant, an authorized representative of applicant or assignee that the deposit has been accepted under the Budapest Treaty would satisfy this rule. Otherwise, viability may be tested by the depository or any other entity provided that the material tested is received from the depository. The viability test must conclude that the deposited biological material is capable of reproduction directly or indirectly and no evidence will be required to satisfy the deposit requirement relative to the ability of the deposited material to perform any function described in the application. However, as with any other issue of description or enablement, if the examiner has evidence or reason to question the objective statements made in the application, applicants may be required to demonstrate that the deposited biological material will perform in the manner described.

A viability statement for each deposit which is not made under the Budapest Treaty must be filed in the patent application and contain the information identified in paragraph (b) of proposed new rule 1.206. The examiner shall not question the conclusion in a viability statement issued by a depository recognized under either proposed new rule 1.202 (a) or (b). If the viability test indicates that the deposit is not viable upon receipt, or the examiner cannot for scientific or other valid reasons accept a statement of viability received from the applicant, the examiner shall so notify the applicant stating the reasons for not accepting the statement and proceed with the examination process as if no deposit had been made.

New rule 1.207 would be proposed to address the conditions under which a deposit must be made in order to satisfy access to the deposit. First, access during the pendency of an application to a deposit must be available to one determined by the Commissioner to be entitled thereto under 37 CFR 1.14 and 35 U.S.C. 122. A deposit pursuant to the Budapest Treaty meets this requirement. Secondly, the deposit must be made under conditions that all restrictions on the availability to the public of the deposited biological material will be irrevocably removed upon the granting of the patent. Conditions on the release of a deposited biological material such as identifying the ultimate recipient of the material, or a provision on the further transfer of the material, or any other stipulation that acts as a precondition to the release of the biological material referenced in an issued patent will be considered to be a prohibited restriction on the availability to the public of the biological material so deposited. The depository may be asked to provide to the depositor such information as the identity of sample recipients but not as a precondition to release after the patent is granted.

Since the mere description of a deposit or identity of a deposit in a patent specification is not necessarily an indication that a requirement for deposit or compliance with these rules has been made, the Office will certify whether a deposit was stated as having been made under conditions which make it available to the public provided the request contains the information set forth in Paragraph (c) of proposed new rule 1.207.

New rule 1.208 would be proposed to set forth the procedures which would be followed by an examiner once the examiner determines that a specific biological material is both essential to make and use the claimed invention and is not known and readily available within the meaning of rule 1.201(b). It is only when the examiner has made these determinations based on the record in the application being considered that the need for a deposit of the identified biological material must be considered. A deposit accepted by an IDA under the Budapest Treaty shall be accepted for patent purposes by the PTO if additional statements are made that all restrictions on the availability to the public of the deposited material will be irrevocably removed upon the granting of the patent, and the deposit will be replaced if viable samples cannot be dispensed by the depository.

A deposit under the Budapest Treaty would mean that a viable deposit has been made (Budapest Rule 10) in an acceptable depository (IDA) for a period of five years after the most recent request and at least 30 years from the date of deposit (Budapest Rule 9) under conditions that access to the deposit will be available during pendency of the patent application to one determined by the Commissioner to be entitled thereto under 37 CFR 1.14 and 35 U.S.C. 122 (Budapest Rule 11.1). Assurance of reasonably permanent availability of the deposited material through the depository is reasonably assured through the deposit of a viable culture under the Budapest Treaty and the requirement to make a new deposit in § 1.204(a). It is sufficient if a written statement is made by applicant, an attorney or agent prosecuting the application or a person representing the assignee that a deposit has been accepted by an IDA under the Budapest Treaty under conditions that all restrictions on the availability to the public of the deposit will be irrevocably removed upon the granting of the patent. A suitable statement would be as follows:

(1) I am (relationship to application)
(2) Viable samples of—
Material:
Accession Number:
Deposit Date:
were deposited and will be maintained with
(3) (Name and Address of Depository)
(4) Under terms which are in accordance with the provisions of the Budapest Treaty.
(5) Upon issuance of a patent on this application, all restrictions on the availability of the deposited material to the public will be irrevocably removed.

Date _____
Name _____

If the examiner determines that a deposit is required and has not been made in compliance with these rules, the examiner shall reject all the affected claims in the application under the appropriate provision of 35 U.S.C. 112, explaining why a deposit is needed or why a deposit which was made cannot be accepted for patent purposes. Although the Court in *Lundak* indicated that the enablement requirement of 35 U.S.C. 112 need not be satisfied until the patent issues, the only way the Office can efficiently and effectively address the deposit issue is during the examination of the application. After the examiner has determined that a deposit is required, and until a deposit in accordance with these rules is made, or until the Office is assured in writing that a deposit in accordance with these rules will be made up to and including the date the issue fee is paid, or the examiner is convinced that a deposit is not required under the circumstances of the application being considered, the rejection will be made and maintained

by the examiner. Written assurance may take the form that an identified specimen will be deposited and maintained in an IDA under the Budapest Treaty before the issue fee is paid under conditions that all restrictions on the availability to the public of the deposited material will be irrevocably removed upon the granting of the patent, or any other specific assurance that the examiner can recognize and accept that there are no outstanding issues to be resolved on the deposit question.

In the circumstances where the Office has received written assurance that an acceptable deposit will be made before or on the date of payment of the issue fee, and there are no other outstanding matters to be considered relative to the patentability of the claims, the Office will mail to the applicant a Notice of Allowance and Issue Fee Due together with a requirement that the required deposit be made within three (3) months. The period for satisfying the requirement for deposit will be extendable under 37 CFR 1.136(a), as is the case with a requirement for drawing corrections made at the time the Notice of Allowance and Issue Fee Due is mailed. In appropriate circumstances, relief also may be available under 37 CFR 1.136(b) if sufficient cause is shown for an extension of time in order to make the appropriate deposit. Sufficient cause would be decided by the appropriate Group Director. Failure to make the required deposit in accordance with the requirement will result in abandonment of the application for failure to prosecute. Since the opportunity exists to request extensions of time under 37 CFR 1.136 to make a viable deposit, no application should go abandoned for failure to make a viable deposit. However, the Office reserves the right to require the filing of a terminal disclaimer where the time required to make a viable deposit unreasonably delays the issuance of a patent.

The contents of the specification regarding any deposit made are specified in new rule 1.206(d). In addition to such identifying criteria as accession number for the deposit and the name and address of the depository, the specification should include the date of deposit (i.e. the date from which the term of deposit specified in new rule 1.205 is to be measured) and a taxonomic description of the deposit. This written description is that required by 35 U.S.C. 112, first paragraph and should be sufficient to characterize and distinguish the biological material deposited. This written description will serve to inform the public of the essential characteristics of the deposited material once the patent is granted, and will facilitate the examination process which necessarily involves comparisons with prior art biological material.

Other Considerations

The rule change being considered for proposal is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Order 12291 and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq.

The rule changes being considered for proposal are not expected to have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354). The proposed deposit practice will not impose extra work on patent applicants (whether small or large businesses or individuals).

The Patent and Trademark Office has determined that this rule change being considered for proposal is not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million. There will be no major increases in costs or prices for consumers, individual industries, Federal,State or local government agencies, or geographic regions. There will be no adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States based enterprises to compete with foreign-based enterprises in domestic or export markets.

Any information collection requirements that may be contained in the proposed rulemaking resulting from proceedings under this advance notice will be submitted for OMB approval at the time the proposed rulemaking is announced.

List of Subjects in 37 CFR Part 1

Administrative practice and procedure, Courts, Inventions and patents.

For the reasons set out, 37 CFR Part 1 is being considered for proposed amendment as follows:

PART 1—RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

Authority: 35 U.S.C. 6 unless otherwise noted.

2. Centered heading and new §§ 1.200 to 1.208 are added as set forth below:

* * * * *

Deposit of Biological Material

Sec.

1.200 Biological material.
1.201 Need to make a deposit.
1.202 Acceptable depository.
1.203 Time of making an original deposit.
1.204 Replacement of deposit.
1.205 Term of deposit.
1.206 Viability of deposit.
1.207 Furnishing of samples.
1.208 Examination procedures.

Deposit of Biological Material

§ 1.200 Biological material.

For the purposes of these regulations pertaining to the deposit of biological material for patent purposes, the term biological material shall include material that is capable of self-replication either directly or after insertion into a host. Representative examples include bacteria, fungi including yeast, algae, protozoa, cell lines, plant tissue cells and seeds. Viruses, vectors, cell organelles and other non-living material existing in and reproducible from a living cell may be deposited by deposit of the host cell capable of reproducing the non-living material. Materials analogous to conventional chemical compounds such as proteins and enzymes are not subject to these regulations.

§ 1.201 Need to make a deposit.

(a) Where a claimed invention is, or relies on, a biological material, the requirements of the first and second paragraphs of 35 U.S.C. 112 apply. Applicant is required to comply with these requirements in the written description of the invention, which may include reference to known and readily available biological material. If the written description does not meet the requirements of 35 U.S.C. 112, the specification may be supplemented by a deposit of samples of the biological material necessary to meet those requirements in a depository and under conditions complying with these regulations.

(b) Biological material need not be deposited if it is known and readily available to the public or can be made or isolated in a reproducible manner from known and readily available material. Biological material will be considered to be known and readily available to the public if samples of the biological material are known and accessible without restriction to those who desire to obtain and test the biological material. Samples will be considered to be accessible even though some requirement of law or regulation of the United States or of the country in which the depository institution is

located permits access to the material only under conditions imposed for safety, public health or similar reasons.

(c) The reference to a specific organism or other biological material in a specification disclosure does not create any presumption that the specific material is necessary to satisfy one or more requirements of 35 U.S.C. 112 or that a deposit in accordance with these regulations is required.

§ 1.202 Acceptable depository.

(a) A deposit may be made in any International Depositary Authority (IDA) as established under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure.

(b) A deposit may be made in any depository recognized to be suitable by the Office. Suitability will be determined by the Commissioner on the basis of the administrative and technical competence, and agreement of the depository to comply with the terms and conditions applicable to deposits for patent purposes. The Commissioner may seek the advice of impartial consultants from the biotechnology industry on the suitability of a depository. The depository must:

(1) Have a continuous existence;

(2) Exist independent of the control of the depositor;

(3) Possess the staff and facilities sufficient to enable it to examine the viability of a deposit and store it in a manner which ensures that it is kept viable and uncontaminated;

(4) Provide for sufficient safety measures to minimize the risk of losing biological material deposited with it;

(5) Be impartial and objective; and

(6) Furnish samples of the deposited material in an expeditious and proper manner.

(c) If any depository under (a) or (b) defaults or discontinues the performance of any of the tasks it should perform, the Office will recognize as a substitute in any pending application or patent a viable deposit made with an IDA or depository recognized to be suitable by the Office which is transferred to said depository from the defaulting depository in the manner required for replacing a deposit under § 1.204.

(d) A depository seeking status under paragraph (b) of this section must direct a communication to the Commissioner which shall:

(1) Indicate the name and address of the depository to which the communication relates;

(2) Contain detailed information as to the capacity of the depository to comply with the requirements of paragraph (b) of this section, including information on its legal status, scientific standing, staff and facilities;

(3) Indicate that the depository intends to be available, for the purposes of deposit, to any depositor under these same conditions;

(4) Where the depository intends to accept for deposit only certain kinds of biological material, specify such kinds;

(5) Indicate the amount of any fees that the said depository will, upon acquiring the status of suitable depository under paragraph (b) of this section, charge for storage, viability statements and furnishing of samples of the deposit.

(e) Once a depository is recognized to be suitable by the Commissioner or has defaulted or discontinued its performance under this section, notice thereof will be published in the Official Gazette of the Patent and Trademark Office.

§ 1.203 Time of making an original deposit.

(a) An original deposit may be made at any time before filing an application for patent or during pendency of the application for patent pursuant to a requirement that will be made by the examiner no later than the date the Notice of Allowance and Issue Fee Due is mailed.

(b) When the original deposit is made in a depository defined in §§ 1.202 (a) or (b) after the effective filing date of an application for patent, a verified statement will be required from a person in a position to corroborate the fact that the biological material described in the application as filed is the same biological material which is deposited in the depository defined in §§ 1.202 (a) or (b).

§ 1.204 Replacement of deposit.

(a) Where a depository possessing the original deposit cannot furnish samples of the deposit for any reason, the depository shall, promptly after having noted its inability to furnish samples, notify the depositor of such inability, indicating the cause thereof, and the depositor shall be required to make a new deposit of the biological material which was originally deposited within three months of receiving notification that the depository cannot furnish samples. The replacement shall be made in the same depository as the original deposit except:

(1) Where the original depository has lost its status under §§ 1.202 (a) or (b) or no longer carries out its obligations applicable to the involved deposit; or

(2) Where the depository for health or other legitimate reasons is unable to provide samples to requesters outside of the jurisdiction where the depository is located.

(b) An applicant or patent owner shall notify the Office in writing as soon as reasonably possible after a replacement deposit is made in each application or patent affected. This notification shall state the name and address of the depository, the accession number for the deposit, the date of making the deposit, the results of a viability test (as provided for in § 1.206), the reason for making the replacement deposit, and a statement that the replacement deposit is to the best of the depositor's knowledge identical to the original deposit. The notification shall be placed in each application or patent file.

(c) A depositor's failure to replace a deposit within three months after learning or after receiving written notice from a depository that a replacement is needed may cause the application or patent involved to be treated in any Office proceeding as if no deposit were made.

(d) In the event a deposit is replaced, the PTO will apply a rebuttable presumption of an identity between the original and the replaced sample where the application or patent making reference to the deposit is relied upon during any Office proceeding.

§ 1.205 Term of deposit.

A deposit shall be made for a term of at least thirty (30) years after the date of a viable deposit and at least five (5) years after the most recent request for the furnishing of a sample of the deposited biological material was received by the depository. In any case, samples must be stored under agreements that would make them available beyond the enforceable life of the patent for which the deposit was made.

§ 1.206 Viability of deposit.

(a) A deposit of biological material must be viable at the time of deposit and during the term of deposit. Viability may be tested by the depository or by another provided the material tested is received from the depository. The test must conclude only that the deposited material is capable of reproduction. No evidence is necessarily required relative to the ability of the deposited material to perform any function described in the patent application.

(b) A viability statement for each deposit not made under the Budapest Treaty must be filed in the application and must contain:

(1) Name and address of the depository;

(2) Name and address of the depositor;
(3) The date of deposit;
(4) The identity of the deposit and the accession number given by the depository;
(5) The date of the viability test;
(6) The procedures used to obtain a sample if the test is not done by the depository; and
(7) A statement that the deposit is capable of reproduction.

(c) If a viability test indicates that the deposit is not viable upon receipt, or the examiner cannot, for scientific or other valid reasons, accept the statement of viability received from the applicant, the examiner shall proceed as if no deposit has been made. The examiner will accept the conclusion set forth in a viability statement issued by a depository recognized under §§ 1.202 (a) or (b).

§ 1.207 Furnishing of samples.

The deposit must be made under conditions that assure that:

(a) Access to the deposit will be available during pendency of the patent application making reference to the deposit to one determined by the Commissioner to be entitled thereto under § 1.14 and 35 U.S.C. 122, and

(b) All restrictions imposed by the depositor on the availability to the public of the deposited material will be irrevocably removed upon the granting of the patent.

(c) Upon request, the Office will certify whether a deposit has been stated to have been made under conditions which make it available to the public as of the issue date of the patent grant provided the request contains:

(1) The name and address of the depository;
(2) The accession number given to the deposit;
(3) The patent number and issue date of the patent referring to the deposit; and
(4) The name and address of the requesting party.

§ 1.208 Examination procedures.

(a) The examiner shall determine in each application for an invention if a deposit is needed, in case one has not been made, or if a deposit actually made is acceptable for patent purposes. A deposit accepted in any depository under the Budapest Treaty shall be accepted for patent purposes if made under conditions complying with § 1.207(b). If a deposit is required and has not been made in accordance with these regulations, the examiner shall in an Office action reject the affected claims in the application under the appropriate provision of 35 U.S.C. 112, explaining why a deposit is needed and/or why a deposit actually made cannot be accepted.

(b) The applicant shall respond to a rejection under paragraph (a) of this section by—

(1) making an acceptable deposit or assuring the Office in writing that an acceptable deposit will be made on or before the date of payment of the issue fee or;

(2) Establishing that the involved biological material is known and readily available to the public or;

(3) Arguing why a deposit is not required under the circumstances of the application considered.

Other replies to the examiner's action shall be considered non-responsive. The rejection will be repeated until either paragraph (b)(1) or (b)(2) of this section is satisfied or the examiner is convinced that a deposit is not required.

(c) If an application is otherwise in condition for allowance except for the required deposit and the Office has received a written assurance that an acceptable deposit will be made on or before payment of the issue fee, the Office will mail to the applicant a Notice of Allowance and Issue Fee Due together with a requirement that the required deposit be made within three months. The period for satisfying this requirement is extendable under 37 CFR 1.136. Failure to make the required deposit in accordance with this requirement will result in abandonment of the application for failure to prosecute.

(d) For each deposit made pursuant to these regulations, the specification shall contain:

(1) Accession number for the deposit;
(2) Date of the deposit;
(3) Taxonomic description of the deposit; and
(4) Name and address of the depository.

Comments and Responses:

(Editorial Note.—These comments and responses will not appear in the Code of Federal Regulations)

The following responses are directed to the comments received in response to the draft policy statement on the deposit of biological materials for patent purposes. The comments are arranged to generally correspond to the order of topics addressed in the draft guidelines.

Comment: The guidelines should make explicit that it is the Examiner's, not the applicant's, burden to show that a written description is not adequate to describe the invention as claimed. This has been a real problem in that simply because a microorganism or other biological material is involved in a particular claimed invention, it is automatically assumed that a deposit should be required. This is, of course, quite out of touch with reality especially when it comes to inventions relating to recombinant technology.

Response: This suggestion has been in effect, since the PTO clearly has the initial burden of giving reasons, supported by the record as a whole, as to why the written description is not sufficient to enable one skilled in the art to make and use the claimed invention in the absence of a particular microorganism or other biological material. All assertions that the written description is not enabling without a deposit must be supported by the examiner with (1) evidence or (2) reasons to support the conclusion of noncompliance. New rule 1.201(c) being considered for proposal also provides explicitly that there is no presumption that a specific material is required simply because it is described in the specification.

Comment: If enablement and description requirements can be met with a written description, is a deposit required solely for compliance with the best mode requirement?

Response: The best mode requirement of the first paragraph of 35 U.S.C. 112 is a separate and distinct requirement from the enabling requirement. *In re* Newton, 414 F2d 1400, 163 USPQ 34 (CCPA 1969). The best mode requirement is a safeguard against the possible selfish desire on the part of some people to obtain patent protection without making a full disclosure. The requirement does not permit an inventor to disclose only what is known to be the second-best embodiment, retaining the best as a trade secret. The fundamental issue that should be addressed is whether there was evidence to show that the quality of an applicant's best mode disclosure is so poor as to effectively result in concealment. *In re* Sherwood, 615 F2d 809, 204 USPQ 537 (CCPA 1980). If a deposit is the only way to comply with the best mode requirement then the deposit must be made.

Comment: We regret that the PTO has not attempted to provide some guidance as to the circumstances under which a biotechnology invention will be deemed to be reproducible from the written description alone. One such circumstance would appear to be where sequence data for the transcriptional unit of rDNA vector is available either directly from the specification, or from the published literature.

Response: While such guidance may be of some assistance, it may be of momentary value because of the changing nature and development of technology. In addition, useful guidelines would be difficult in view of the tremendous variety of factual circumstances that play a role in determining whether the claimed invention can be practiced without undue experimentation. Some guidance is available in *Ex Parte Forman*, 230 USPQ 546 (BPAI 1986) where the Board of Patent Appeals and Interferences summarized eight (8) factors to be considered in a determination of "undue experimentation."

Comment: Please consider replacing the word "define" in the phrase "define the metes and bounds of the claimed invention" with the word—support—because applicant should be allowed to select representative biological samples to place on deposit which support rather than define the "metes and bounds" of the claimed invention.

Moreover, the deposited biological sample which applicant demonstrates, by the description in the application, to be operable should be deemed sufficient by the PTO to satisfy the deposit requirement and provide adequate basis for applicant to claim variants of the deposited material. Another comment expressed concern that limiting claims to the deposited material (*Ex Parte Jackson*) may become the norm in patent examination practice if such language is included.

Response: Claims are required to set out and circumscribe a particular area with a reasonable degree of precision and particularity. 35 U.S.C. 112, second paragraph. This requirement is separate and distinct from the requirement of the first paragraph of 35 U.S.C. 112 that the specification disclosure enable one skilled in the art to make and use the invention to a degree commensurate in scope with the claims. Under appropriate circumstances, it may be necessary to specially recite and limit the claims to the deposited biological material in order to adequately define the metes and bounds of the claimed invention. *Ex parte* Jackson, 217 USPQ 804 (Bd. App. 1982). However, the mere facts that a claimed invention requires the use of a living organism or that samples of a living organism that may be used in the claimed invention have been deposited are *never alone* sufficient to require applicant to comply with the deposit guidelines or limit any claim to the deposited material.

Comment: There is some interest that the Patent and Trademark Office be requested to print deposit information on the front page of the issued patent—analogous to the cited references rather than buried in the general text.

Response: At the last meeting of the WIPO Permanent Committee on Patent Information, a revised standard was approved recommending use of INID (*I*nternationally agreed *N*umbers for The *I*dentification of *D*ata) codes to identify bibliographic data on the front page of patent documents. A new INID Code (83) has been approved to identify information concerning the deposit of microorganisms, e.g., under the Budapest Treaty.

The PTO is not considering the publication of deposit information on the front page of an issued patent because of the substantial administrative burden that would be involved for a relatively small number of patents. No compelling need or rationale is apparent that would justify the cost for the rare case where such a format may be more convenient.

Comment: The practice of presenting a microorganism for deposit in connection with a patent application was initially adopted as a means for complying with the requirements of section 112. The PTO's current proposal would make a deposit mandatory under administrative rulemaking, for compliance with the requirements of 35 U.S.C. 112 in an invention which "depends on the use of biological material".

Response: The PTO proposal does *not* make a deposit mandatory for an invention which depends on the use of biological material. The PTO policy and deposit requirements are intended to provide guidance in those situations when it is determined that a deposit is necessary to satisfy one or more requirements of 35 U.S.C. 112. The proposed rules concern the requirements and procedures for making a suitable deposit if it is determined that a deposit is required before a patent can be granted. The guidelines associated with the proposed rules recognize that the specification may properly rely on information which is publicly available.

Comment: Some recognized culture collections do not make their strains readily available. What can a requester do if it is found that the biological material is not readily available. Most of us do not have access to legal recourse.

Response: The PTO will assume that any deposit made according to these regulations will be readily available upon the granting of the patent. This is a rebuttable presumption that could be overcome only by evidence of the nature which would show that the patent relied upon is inoperative. Since every patent is presumed valid and since that presumption includes the presumption of operability, the burden of proof is high. The PTO does not have the resources to police the depositories such that the depositor must assume the risk that the depository selected will preserve and maintain the deposit made.

Comment: It was suggested that the statement that the availability of the biological material must be such that there is no reasonable basis to question the continued availability of the biological material beyond the enforceable life of a patent was overly stringent. Citing *In re Metcalfe*, 410 F.2d 1378, 161 USPQ 789 (CCPA 1969).

Response: The suggestion that the proper perspective should be whether there is reasonable basis to believe that the biological material will cease to be available during the life of the patent has been adopted.

Comment: The draft guidelines indicated that a material would be considered to be known and readily available to the public even though some requirement of law or regulation restricted access to material for safety, public health or similar reasons. It has been suggested that the term "national security" be specifically defined in the list of exceptions since this constitutes the basis which precludes making available to the public significant amounts of governmental information. It was further suggested that the phrase "of either of the United States or of the state in which the depositor or the depository institution is located" be added after regulation in the acknowledgment of the fact that biotechnology is an international industry. Finally, it was noted that companies may find it advisable to restrict access even in the absence of any formal legal requirement for product liabilty reasons so that the PTO should regard more leniently restrictions which are fully imposed for public health reasons even if not required by law or regulation, and particularly if they are required by an insurer.

Response: First, the PTO has not seen fit to add national security as a specific item which would permit restriction on access to a biological material which would still be considered to be known and readily available. It is difficult to determine with any degree of certainty what any country may consider to be national security. Further, an invention which involved national security matters would not be published before the restrictions on access to that invention involving national security were removed.

Secondly, while the international scope of the biotechnology industry is clearly recognized, the proposal to include the country or state in which the

depositor is located would appear to be unnecessary so long as the requirement of law or regulation would apply to the depository institution where the deposit is located. accordingly, the suggestion has been adopted to this extent.

Finally, it is believed inappropriate for the PTO to accept a biological material to be known and readily available to the public on the basis of what some private insurer may require of the depositor. Unless the restriction is based on some requirement of law or regulation which restricts access to the material for safety, public health or similar reasons, the PTO will not consider that a biological material is known and readily available to the public.

Comment: It was suggested that a biological material should not have to be deposited if it could be readily reproduced from materials known and available to the public based on the description of how to make and use found in the disclosure.

Response: This suggestion has been adopted in the first sentence of new rule 1.201(b) being considered for proposal which includes the statement that the biological material need not be deposited if it can be made or isolated in a reproducible manner from known and readily available material.

Comment: The guidelines had stated that the fact that the biological material had multiple known uses would tend to provide assurance that the required biological material would continue to be available. It was noted that this might be construed to mean that a recitation of multiple uses in applicant's disclosure is evidence that the biological material would be readily available to the public which clearly it is not.

Response: The person making the comment accurately noted that the two have no bearing one to the other. However, if there was evidence that the biological material had been put to use for more than one purpose by a variety of people, it would be considered to constitute at least an indication that the biological material in question was known and accessible to those who desire to obtain at least a sample of the subject biological material. It would have been evidence of distribution in commerce, consistent with the idea that it was known and readily available.

Comment: With respect to biological material that is known and readily available, the initial guidelines indicated that the written description in the specification should contain information on the biological material to the extent available. This, according to the comment, could be construed as requiring an enormous amount of information.

Response: This comment is well taken. Accordingly, new rule 1.201(b) would be proposed to require that the written description of the biological material should be sufficient to allow one of ordinary skill in the art to identify and obtain the publicly available material.

Comment: The initial guidelines stated that material would be considered to be known and readily available if the biological material was known and accessible to those who would desire a sample to practice the invention. The comment indicated that the word "practice" implies a right to utilize the deposited materials and thus the invention. This right does not exist absent a license if the material is protected by a patent. Experimental use is not a right but rather an exception to a finding of infringement and thus subject to different burdens of proof. It was suggested that the word "test" be substituted for practice.

Response: This suggestion would be adopted in new rule 1.201(b) since the concept of whether a biological material is known and readily available to the public is not determined on the basis of whether or not its manufacture, use or sale would infringe an existing patent.

Comment: There is no statutory basis in U.S. law for supporting the position that availability of the biological material must extend beyond the enforceable life of a patent. To require otherwise is to inequitably place a patentee in a position that amounts to guaranteeing a supply of the "manufacturing facilities" to competitors at little or no cost and at a time when the competitors are free to use the deposited material without an accompanying benefit to the ex-patentee.

Response: This provision finds specific basis in the decision of *Ex Parte Lundak*, and is based on one of the basic principles of the patent system—i.e. that a patent is an exclusionary right granted for a "limited" time and that the public is not excluded from practicing the invention once the patent expires. This does not mean that the patentee must be a perpetual supplier of the biological materials that may be necessary to practice the invention. However, it does mean that the patentee should not be permitted to place a limitation on the accessibility of the necessary biological material once the patent expires. As noted by the Court in *In re Metcalfe*, 410 F2d. 1378, 161 USPQ 789 (CCPA 1969) it is always possible that the practice of a given patented invention may become impossible because an essential material becomes unavailable due to a lack of raw materials, public disaster, or other occurrence not within the control of the patentee. The proposed regulations contemplate that the patentee would not control the availability of the biological material once the patent has expired.

Comment: The phrase "known and readily available" should be in the disjunctive. There is no case regarding regular chemical inventions that chemicals used by an applicant need to be both known and readily available.

Response: The phrase "known and readily available" was selected to indicate public accessibility to those wishing to test the biological material. A material may be known in the sense that its existence has been published, but is not available to those who wish to test that particular known biological material. In addition, a biological material may be available in the sense that those having possession of it would make it available upon request, but no one has been informed of its existence. Consequently, the concept of known and readily available is considered to accurately define the level of public accessibility to the biological material intended.

Comment: An examination of the PTO policy statement on the deposit of biological materials suggests that the only safe procedure for satisfying the requirements of 35 U.S.C. 112 would be to require a deposit or to establish that the biological material is readily available in nature or can be obtained by some type of screening procedure. The other criteria set forth pertaining to "known and readily available to the public" did not appear to have sufficient safeguards for access during the term of the patent and after its expiration date.

Response: While there is clearly an element of risk involved in trying to preserve living matter over an extended period of time even with a deposit, the Office believes that where there is a sufficient indication that the biological material has reached a sufficient level of accessibility and availability for distribution which is intended to be captured by the concept of "known and readily available" the public interest has been served as necessary to support a patent grant. The incentives provided by the patent system should not be constrained by the possibility that a disclosure that was once enabling would become non-enabling over a period of time through no fault of the patentee. *In re Metcalfe.*

Comment: Several people made comments relative to the commercial availability of the biological material being an indicator that the material was known and readily available.

Suggestions were made to substitute "applicant or applicant's assignee" for those relying on the availability of the biological material and to clarify the "patent holder's agent".

Response: The PTO does not want to guess or be constrained by any particular business relationship that may be created to control accessibility of the biological material to the public. The concept was intended to embrace the situation where an applicant or a patentee before the Patent and Trademark Office relying on the public availability of the biological material through a commercial supplier is not likely to restrict access once the patent is granted.

Comment: While some characterize the PTO's concern for commercial suppliers under the control of those relying on the availability of the biological material as almost insulting, others indicated that they could appreciate the PTO's concern when the patent holder controls commercial availability. One person suggested that a patent owner who tried to restrict access after a decision was made not to enforce the patent would run the risk that a disgruntled requester would seek treble damages anti-trust action based on patent misuse, or a requester might file a complaint with the FTC or the anti-trust division of the U.S. Department of Justice. Moreover, it was suggested that a disappointed requester could certainly notify the PTO of the incident which might result in a disciplinary proceeding against the patent counsel, and would certainly discredit subsequent attempts by the same patent owner to rely on an allegation of commercial availability. It was also suggested that it would be appropriate for the PTO to suggest one or more means by which a patent owner could provide acceptable assurance that the biological materials would remain available such as by deposit of a performance bond which would be forfeited if the biological material is not provided to a lawful customer upon tender of payment.

Response: The PTO does not have the resources or expertise to engage in the type of enforcement procedures suggested in these comments. Further, there is clearly no evidence at this point in time to provide for the mere possibility that a commercial supplier may be motivated to eliminate or otherwise restrict access to the biological material once the patent is no longer enforceable or a decision is made not to enforce the patent.

The PTO will accept commercial availability as evidence that a biological material is known and readily available only when the evidence is clear and convincing that the public has unrestricted access to the material. A product could be commercially available but only at a price which effectively eliminates its accessibility to those desiring to obtain a sample. The relationship between an applicant relying on a biological material and the commercial supplier relied upon is simply one factor that would be considered in determining whether the biological material was known and readily available. However, the mere fact that the biological material is commercially available only through the patent holder or the patent holder's agents or assigns shall not by itself justify a finding of non-availability, absent reason to believe that access to the biological material would later be improperly restricted.

Comment: Several comments were received directed to the use of printed publications providing evidence that the biological material is known and available to the public. It was suggested that the probative value of this type of evidence should depend not only on the number of publications but also the character and institutional affiliation of the publications. It was also suggested that foreign applicants would rightfully object to consideration of whether the publications are domestic or foreign. One comment stated that the concept of peer review should be eliminated and that inquiry be made into whether the publication policy of the journal makes references to the availability of cited material, and whether that policy is in fact enforced. Finally, it was indicated that it was impractical to expect an applicant to provide a tally or comprehensive search of technical journals and patent literature to establish availability of biological materials.

Response: The PTO does not believe that it is possible to list all the possible factors that might be considered relevant or how they would be weighed under any particular factual circumstances to determine whether a biological material is known and readily available to the public. However, it is considered appropriate to list exemplary factors that might be considered in determining the probative value of this type of evidence. There was no intent to discriminate between domestic and/or foreign applicants or publications, but the reference to domestic and foreign publications could be an indication of the scope of distribution of the biological material in question. Thus, publications in a single country, whether it be domestic or foreign to the United States, would suggest more limited distribution than references and publications of both domestic and foreign origin. Finally, there is no requirement to demonstrate that a biological material is known and readily available by any particular set of facts, but the PTO has provided some guidance in proposed rule 1.201(b) and associated text as to the variety of circumstances that an applicant may use to establish that a biological material is known and readily available to the public.

Comment: The language pertaining to declarations of accessibility which indicate a preference for those who are not members of the same organization as applicants in the application should be deleted because it suggests a higher level of credibility attaches to the declaration of such an individual.

Response: While it is recognized that the declaration executed by any declarant is subject to the same penalties under § 1001 of Title 18 of United States Code, it can be agreed that the evaluation of declarations should be based solely on their merit and not the organizational relationship between the inventor and the declarant. However, the preference was directed not to the credibility of the declarant, but whether accessibility was known beyond the confines of the organization of which both the applicant and the declarant were members. The knowledge might be compared to an uncataloged manuscript in a library that was distributed among the staff of an organization which included that library but was unknown to people outside that organization. Again, the mere fact that applicant and declarant were members of the same organization should not by itself justify a finding that the biological material in question is not known and readily available. Other factors such as the nature of the organization, distribution of the biological material, and procedures or mechanisms for access would also be considered.

Comment: The meaning of the term "abundantly" as modifying the availability in nature of the biological material was not understood. It was pointed out that a rare microorganism might be readily obtained if a good screening procedure was available. It was also pointed out that it was not understood what is meant by evidence of being available in nature since a description in the patent of a precise geographic location should be sufficient because this is an instance when a deposit is not required.

Response: These suggestions have been essentially adopted. As noted in one of the comments, the decision by the

PTO Board of Patent Appeals and Interferences (Reinhardt, US Patent 4,548,814) held that a description of the precise geographic location of Marine Tunicates used in the patent was adequate to satisfy the enablement requirement. However, use of the term "readily" to define availability is considered appropriate to define that degree of availability which would be reasonable under the circumstances. For example, when an applicant tried to rely on patent applications which had been opened for public inspection in Rhodesia, Panama and Luxembourg to fulfill the enabling requirement, the Court held that when no guide at all has been given in the application, an applicant must show that anyone skilled in the art would actually possess the requisite knowledge or would reasonably be expected to check the source which the applicant relies upon to complete his disclosure and would be able to locate the information with no more than reasonable diligence. In re *Howarth*, 210 USPQ 689 (CCPA 1981).

Comment: It was suggested that there is no good reason why a previous deposit can be relied upon only when it is referred to in a United States patent or statutory invention registration as opposed to a foreign patent. One person went so far as to suggest that any reference to a microorganism deposited in one of the recognized depositories should be sufficient in and of itself.

Response: Since the arrangement made with the depository is one between the depository and the depositor, the simple deposit of a biological material in a recognized depository is not sufficient in and of itself to satisfy the requirement of the biological material to be known and readily available. However, if the deposit has been accepted under the Budapest Treaty and made under conditions that all restrictions on its accessibility will be irrevocably removed upon the granting of the patent, whether the deposit is referenced in a United States or foreign patent document would not make any difference. However, there may be limitations on release of the biological materials that are permitted in other countries but which are not within the scope of the conditions accepted in the United States once the patent has been granted. Consequently, the mere reference in any document, be it a United States patent or a patent in a country foreign to the United States is not in and of itself sufficient to establish that it is known and readily available unless the deposit has been made under conditions which are consistent with those specified in these proposed rules.

Comment: It would be very helpful if you included a statement to the effect that if a deposit meets the requirement of the Budapest Treaty, the Office will accept the deposit.

Response: An explicit provision to this affect would be included in new rule 1.208(a). It would state that a deposit accepted in any depository under the Budapest Treaty shall be accepted for patent purposes if made under the conditions complying with 1.207(b)—that all restrictions on the availability to the public of the deposited material will be irrevocably removed upon the granting of the patent. The additional requirement of 1.207(b) must be stated since the Budapest Treaty leaves to the national laws the specific provisions to obtain access to a sample after the patent has issued. The requirement to maintain a viable deposit of the biological material (1.204a) recognizes the public interest in the availability of the information and materials to make and use the claimed invention.

Comment: The inventor of a biological invention should not be hostilely discriminated against by satisfying a higher burden to prove enablement but should instead be treated on the same basis as are all other applicants. The proposed guidelines should allow for and recognize that in many instances a deposit simply is not required.

Response: There was no intent in the proposed guidelines nor in the proposed rules to alter in any way the standard of enablement required by 35 U.S.C. 112, first paragraph. The rules being considered by the PTO specifically indicate that a biological material need not be deposited if the written description is sufficient to meet the requirements of 35 U.S.C. 112 or if the biological material is known and readily available to the public or can be made or isolated in a reproducible manner from known and readily available materials. See new rules 1.202 (a) and (b) being considered for proposal. In addition, it is specifically stated that the mere reference to a specific organism or other biological material in a specification disclosure does not create any presumption that the specific material is necessary to satisfy one or more requirements of 35 U.S.C. 112 or that a deposit is required to be made. See new rule 1.201(c) being considered for proposal.

Comment: Requiring that the deposits be made in an IDA is excessively burdensome, particularly to a small inventor and those academic institutions which generate in the course of a typical research program dozens or even hundreds of hybridomas which must then be deposited if the institution is to comply with PTO deposit guidelines. Depositing of biological materials (when required) at any location should be sufficient providing that the averments for appropriate access and supply of viable material can be made. The patentee has the most at stake in insuring that the deposit is maintained and available during the life of the patent. If the deposit is permanently lost, the patent will be lost also. The entire rationale for requiring an independent depositor is to remove the responsibility from the patentee and place it in the hands of an independent third party. If the depository is required to replace a strain if it becomes non-viable, it would appear that double depositing is necessary. The logical thing, according to one comment, is either to have the third party depository entirely responsible for the culture or to permit the depositor to maintain his own cultures.

Response: The concept of an independent depository or an IDA as an acceptable depository is based on the need and desire to ensure the safe and reliable storage of a deposited biological material under circumstances that are free of the opportunity for intentional or negligent handling of the deposited material. The use of an independent depository or an internationally recognized depository will tend to preserve the integrity of the deposit process against those that may accidently alter the deposited material, may wish to tamper with the deposited material or may wish to resume control of its availability when the patent is no longer enforceable, and to preserve the interest of the public in the free access to the biological material for any purpose once the term of the patent expires. Further, while the PTO is constrained to approve independent depositories other than an IDA, the PTO has neither the resources nor capability to assess the individual capability of any party that wishes to act as its own depository. The rules under consideration are intended to minimize depositories that will be found acceptable.

The concept of having an independent depository in addition to the requirement of the depositor to replace a culture which is no longer viable is based on the premise that the patent owner has an interest in maintaining the accessibility of the deposit during the enforceable life of the patent for its own protection, and has an obligation to the public to ensure access to that deposit

during the period of enforceability so that a third party could test the biological material, and availability to the public after the patent expires. A patentee should not be able to intentionally convert a patented biological material to a trade secret merely because it was no longer interested or able to enforce the patent.

Comment: A depository does not normally notify the depositor when his strains are supplied to third parties except under the Budapest Treaty. Does this mean we must now change our policy.

Response: No.

Comment: Several comments were received to the effect that due to the nature of deposits, and the ease with which harmful infringing acts can be practiced following access to deposited material, it is reasonable to require that minimum restrictions be made before a request for access to a deposit is satisfied. Such minimum restrictions should include (1) identification of the ultimate recipient and (2) an averment that the ultimate recipient will not use the deposited materials for any uses which would infringe a valid claim and (3) a prohibition against transfer to third parties. The thrust of these arguments is that a patentee has a definite interest in knowing to whom the deposited material is being released and such restrictions would provide the patentee with some measure of protection against those who would unfairly profit from the required deposit. It was concluded that these provisions would not in any substantive way interfere with the purpose of a deposit under 35 U.S.C. 112 or the public disclosure function served by the patent system.

Response: While the unique nature of a deposit in satisfying the enabling or other requirements of 35 U.S.C. 112 is recognized, every patent is required to place in the hands of those skilled in the art to which the invention pertains the information required to make and use the invention without undue experimentation. The PTO does not restrict or otherwise monitor the sale of other patent documents containing an enabling disclosure nor place any limits on the further disposition of patents that it sells. Consequently, there is no basis in the law for treating a patent directed to an invention requiring the use of a deposited biological material in any manner different from a patent which does not require a deposit. Patents not requiring a deposit may involve subject matter which is just as difficult to detect infringement as it may be where no deposit is required.

The PTO recognizes the unique nature of an invention which requires the deposit of a sample of a biological material as part of the disclosure, particularly as it relates to the attendant risks that the sample may be used in a way or location that would avoid infringement of the patent. The PTO, however, solicits comments on the advisability of and rationale for seeking a provision in the law that would permit the type of restrictions on access to a deposit after the patent issues that are recommended in the April 8, 1987 WIPO report on the Industrial Property Protection of Biotechnological Inventions. These recommendations, on which we are seeking comment, were as follows:

Samples shall be furnished only if the requesting party has undertaken vis-a-vis the owner of the patent on which the request is based, for the period during which the patent is in force:

(i) Not to make the deposited biological material or any biological material derived therefrom available to any third party;

(ii) To use the deposited biological material or any biological material derived therefrom only for experimental purposes concerning the invention;

(iii) Not to export the deposited biological material or any biological material derived therefrom to any other country or, if the sample was obtained in the country where the depository institution is located and that country is not the country in or for which the patent on which the request was based has been granted, to any other country than the country in or for which the relevant patent has been granted;

(iv) The requesting party shall have the burden of proof concerning compliance with the undertakings referred to in subparagraphs (i–iii); and

(v) For the purposes above, any biological material shall be deemed to be derived from the deposited biological material if it is derived therefrom by culturing or in any other way of replication, provided that the derived matter still exhibits those characteristics of the deposited biological which are essential for the carrying out of the invention.

Comment: The guidelines appear to ignore that the identification of ultimate recipient and limitations on further transfer are required in many cases under the export control laws administered by the Commerce Department. Depositories such as the ATCC regularly apply for licenses before releasing strains. It would appear entirely consistent, therefore, to allow depositors to require that requesters comply with the export control laws since the depository must do so in any event.

Response: The rules being considered by the PTO require only that the depositor make the deposit under such conditions that all restrictions made by the depositor on the availability to the public of the deposited material will be irrevocably removed upon the granting of the patent. This condition does not affect laws or regulations that restrict access for public health or safety reasons.

Comment: The requirement for the patentee to notify the depository promptly after issuance of the patent is unwise and unnecessary. One comment suggested that the use of the word "promptly" is vague and presents the opportunity for problems to arise. The provision was considered unnecessary because the depository releases the deposit when the requester provides the depository with a copy of the issued patent.

Response: This provision has been removed from the rules being considered by the PTO. However, it should be noted (new rule 1.201(c) being considered for proposal) that the mere reference to a specific biological material in the specification disclosure does not create any presumption that the specific material is necessary to satisfy one or more requirements of 35 U.S.C. 112 or that a deposit in accordance with Office policy has been made. A procedure is defined in new rule 1.207(c) being considered for proposal whereby the Office would certify whether a deposit has been made under conditions which make it available to the public as of the issue date of the patent grant.

Comment: Some of the comments received on the requirement for a viability statement provide an adequate response to other comments received. For example, some comments indicated that there should be a presumption that the microorganism is alive and that such testing should not be required. On the other hand, one comment was received to the effect that we should be aware of the problem that material shipped to depositories which, presumably, was viable when shipped, is received and when tested is not viable. This is not uncommon at the ATCC. Another comment indicated that if a viability statement is required it should be done by the depository if the biological material is deposited in a public depository. Another comment indicated that this person was pleased that we have included the third party competent to test for viability option. In some cases tests for viability can require expertise which might not be available at a depository. This option could be very helpful.

Response: Based on the evidence and comments received to date, the PTO is convinced that the requirement for a viability test is appropriate.

Comment: A deposit for either the enforceable life of the patent or for the 30/5 years of the Budapest Treaty should be considered acceptable. While the Budapest Treaty is an executive agreement, and therefor cannot override any clear dictate of 35 U.S.C. 112, it seems presumptuous for an office of an executive department to adopt a policy which is contrary to that embodied in an executive agreement.

Response: The period literally defined in the Budapest Treaty is considered acceptable for a deposit made under that Treaty. However, it is not difficult to imagine a situation where the period defined in the Budapest Treaty would not necessarily extend beyond the enforceable life of the patent. In the Board's decision in Ex Parte *Lundak*, it was noted that one of the basic principles of the patent system was that the public would not be prohibited from practicing the invention after the enforceable life of the patent. Implicit in that basic principle is the logic that a depositor should not be able to make a deposit under conditions that do not provide for storage beyond the enforceable life of the patent. Nor do we believe that the Budapest Treaty contemplated that the deposit would not be available while the patent is in force. The patentee need not be a guarantor of the availability of the deposited material after the enforceable life of the patent, but neither should the patentee be permitted to provide for storage only up to the date the patent expires.

Comment: The requirement for corroboration goes beyond the holding in *Lundak*. The requirement is unprecedented in ex parte prosecution. The PTO has regularly accepted Rule 131 declarations without corroboration, and to require it in the deposit situation would be completely inconsistent. The guidelines also fail to address what would be sufficient corroboration.

Response: The degree of corroboration required would depend on circumstances in the individual application. For a situation such as *Lundak* where a mistake was made relative to the presence of a deposit at the time of filing followed by a deposit within a week to ten days, a verified statement tracing the steps undertaken to deposit the biological material from the point of time of the filing date of the application to the actual deposit would be sufficient. It is the function of the description requirement to ensure that the subject matter that is later claimed in the patent was described in the application as originally filed. Consequently, an applicant who waits to make the deposit until sometime after the filing date of the application has the burden of showing that which is later deposited was the same biological material as existed and was described in the application as originally filed. Corroboration can take any form which is suitable to establish the fact, as opposed to a bare statement made on information and belief, that the deposited material is the same as that which existed as of the filing date of the application. If the material was viable and capable of reproduction as of the time of deposit, the verified statement should indicate that the material was viable and capable of reproduction as of the filing date.

Comment: It would seem that the two month formalities notice under Ex Parte *Quayle* would be appropriately used in instances where an application is allowable but assurance of public accessibility has not yet been made. There is no statutory authority for setting a three month period for response which would not be extendable upon payment of the appropriate fee.

Response: The PTO believes that once the issue of deposits has been either resolved or is in dispute, no additional time should be necessary. The basic concern is an adverse impact on pendency and disclosure to the public for no apparent reason. If an applicant is going to dispute the necessity of a deposit or the conditions under which it is made, then an appropriate appeal can be taken on that issue. If applicant agrees that a deposit is necessary, the three month period to pay the issue fee is considered adequate to get that job done. Nevertheless, provision has been made in new rule 1.208(c) being considered for proposal for an extension of time under 37 CFR 1.136.

Comment: There should be more specific guidelines as to the form of assurances that will be accepted for making an appropriate deposit. An averment by the applicant, assignee or attorney, in papers submitted during pendency of the application should be acceptable to the PTO. Deceit by such applicant, attorney or assignee should be dealt with in the same manner as deceit in conventional chemical cases.

Response: The Office will accept any assurance made in the record with the intent that the PTO rely on applicant to fulfill the deposit requirement as set forth in these proposed rules. The PTO will ensure that applicants have filed a statement that all conditions have been satisfied before the application is allowed to become a patent.

Comment: The PTO policy and guidelines should not make statements or predictions as to burden of proof during enforcement or other actions in a court of law. The indication that the burden of proof to establish an identity between the replaced sample and the original deposit may be on those seeking to enforce the patent outside the PTO goes against a statutory presumption of validity.

Response: The rules being considered by the PTO are limited to the presumption that the PTO will make in any proceeding involving the patent before the PTO.

Comment: It has been suggested that the procedure to be followed when biological material becomes unavailable be separate from the rest of the paragraph dealing with replacement deposits so that these separate situations are not viewed as one. For example, cessation of availability of biological material not previously deposited can result from, for example, the bankruptcy of the sole commercial supplier of the material. Under such circumstance, a deposit of no longer readily available material would be required.

Response: Since the necessity or desirability of replacing a deposit may arise from a number of circumstances, the PTO does not consider it appropriate to define separate rules or procedures for making a replacement under each circumstance. The rules being considered by the PTO are limited to a replacement right only for the original depositor. As one comment observed, the law on property rights in biological materials is somewhat unclear at this time and redeposit by a party other than the original depositor might be considered an act of conversion, depending on the precise circumstances. Moreover, the PTO has indicated an intention of applying a rebuttable presumption that once a biological material has been deposited for the term and under conditions specified in these rules under consideration by the PTO, the biological material deposited would be considered to be known and readily available to the public.

Comment: The guidelines are unclear as to the ability to obtain the benefit of a foreign priority date. Apparently, the PTO is aware that *Lundak* held that 35 U.S.C. 112 requires that a deposit be made and a reference added to the specification before the U.S. patent issues. Thus, 35 U.S.C. 119 affords the benefit of the priority date even if the priority document fails to mention a deposit and even if a deposit had not been made.

Response: The PTO will follow the same procedures for handling a claim for foreign priority in all applications. The examiner will acknowledge a claim for foreign priority when all formal requirements are met and will not consider the merits of an applicant's claim of priority unless a reference is found with an effective date between the date of foreign filing and the date of filing in the United States or when an interference situation is under consideration. Where the merits of a claim for priority need to be determined, the examiner will follow the guidelines in § 201.15 of the Manual of Patent Examining Procedure in making that determination. It must also be emphasized that applicants may not be granted priority in applications filed in countries foreign to the United States if they fail to make a deposit in a permanent depository acceptable to that foreign country before the filing date of the application in the United States.

Comment: If a deposit is found to be contaminated, what option does a depositor have? Can the deposit be replaced and the original deposit date be retained?

Response: If a deposit can still be considered to be viable, even though contaminated, the rules being considered by the PTO would not permit replacement of the original deposit. While there may be an appropriate mechanism for substitution of a deposit number in an existing application, the original deposit, even though contaminated, would provide the best evidence of whatever it was that was originally deposited and should be preserved.

Comment: If a deposit does not produce the product for which it was deposited (antibiotic, for instance), what option does a depositor have? Can the deposit be replaced and the original date retained?

Response: Any deposit which is made in accordance with the rules being considered by the PTO would have only a viability statement associated with it. There is absolutely no proof that the material originally deposited was capable of producing the product for which it was deposited. While it's clearly in the interest of the public to have a deposit available to it which is capable of making the product for which it was deposited, the destruction or replacement of the best evidence of what was originally deposited should not be lost if made in association with an existing patent. Perhaps the depositories should consider preservation of samples of the original deposit in conjunction with a deposit which is neither contaminated nor incapable of producing the product for which it was deposited.

Dated: June 19, 1987.

Donald J. Quigg,

Assistant Secretary and Commissioner of Patents and Trademarks.

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	Milwaukee Public Library	(414) 278-3247

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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF August 15, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-13-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	9-07-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-16-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	7-10-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-25-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	5-28-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during August 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,522,401 to 3,526,003, inclusive

Plant Patents ..... Numbers 2,986 to 2,988 inclusive

REEXAMINATIONS

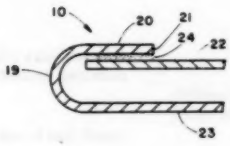
SEPTEMBER 29, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,575,123 (763rd)
REPORT COVER

John P. Giblin, Mountain Lake, N.J.; Andrew E. Semancik, Joppa, Md., and Sherman D. Forehand, Trussville, Ala., assignors to Champion International, Stamford, Conn.

Reexamination Request No. 90/001,114, Oct. 10, 1986.
Reexamination Certificate for Patent No. 4,575,123, issued Mar. 11, 1986, Ser. No. 634,374, Jul. 25, 1984.
Int. Cl.[4] B42D *3/10, 3/18;* **B42B** *5/06*
U.S. Cl. 281—48



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 2, 4, 5, 7 and 8 are cancelled.

Claims 1 and 6 are determined to be patentable as amended.

Claim 3, dependent on an amended claim, is determined to be patentable.

1. A report cover comprising a folded cover adapted to hold papers each having one edge extending parallel and contiguous to the fold in the cover, a strip secured to one of the exterior sides of the cover and extending parallel and contiguous to the fold in the cover, *said strip being an extension beyond the fold line of the other side of the cover and overlapping and being secured to the one side of the cover,* a channel-shaped gripping member extending along the fold and having the interior of the free end of one of its legs formed with a stop that juts out in the direction of the other leg, the gripping member being adapted to firmly grip the cover and the papers by laterally sliding the gripping member onto the cover so that the stop of the one leg interlocks with a longitudinal edge of the strip and the one side of the cover to prevent motion of the gripping member toward and perpendicular to the longitudinal edge of the strip and the other leg engages the other side of the cover.

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,509

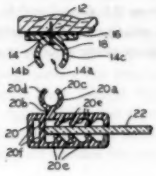
INSULATING STORM WINDOW ATTACHMENT

David G. Werner, Oshkosh, Wis., assignor to Nu Lease Corporation, Oshkosh, Wis.

Original No. 4,452,020, dated Jun. 5, 1984, Ser. No. 372,336, Apr. 27, 1982. Application for reissue Oct. 30, 1985, Ser. No. 792,913

Int. Cl.[4] E06B *3/26*

U.S. Cl. 52—202 16 Claims



1. An insulating storm window assembly for attachment to an existing window casing, for providing enhanced insulation characteristics for the window comprising:

a storm window frame, having a slot;

a storm window glazing fastened into the slot of said frame;

said storm window frame also having a ridge;

as a separate component, a frame retainer, having channel means for snap-accepting the ridge of said frame such that *said ridge is received into said channel means and* said frame is allowed to pivot with respect to said retainer, *and about said channel means,* and thus providing an airtight seal; and

means for permanently attaching said retainer to the existing window casing.

Re. 32,510

HOSE STORAGE APPARATUS

Cosmo N. Tisbo, Lake Barrington Shores; Thomas A. Tisbo, Barrington; Richard D. Recker, and Bruce Heggeland, both of Palatine, all of Ill., assignors to Suncast Corporation, Ill.

Original No. 4,512,361, dated Apr. 23, 1985, Ser. No. 445,100, Nov. 29, 1982. Application for reissue Oct. 29, 1986, Ser. No. 925,692

Int. Cl.[4] B65H *75/34*

U.S. Cl. 137—355.27 17 Claims

27. A portable garden hose cart for windably holding a garden hose and for use in transporting said garden hose between a storage location and a use location, said cart comprising:

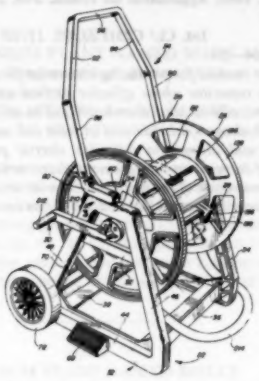
a frame including a pair of generally vertical sides each of which has a bearing with a bearing surface;

a reel for windably receiving said garden hose disposed between said frame sides, said reel including a pair of reel sides and a hose support surface extending between the sides, each reel side including a generally horizontally extending hub, each hub being rotatably received in the corresponding bearing surface of its associated frame side;

an outlet tube carried by said reel for rotation therewith and having an end adapted for attachment to an end of the garden hose;

an inlet tube mounted in one of said hubs so that said inlet tube does not rotate with said reel with said inlet tube and said outlet tube being in fluid communication; and

circular resilient sealing means in sealing engagement with both said inlet tube and a component rotatable with said reel, said sealing means being retained inside said one of said hubs



substantially vertically aligned with the bearing surface of the frame side holding that hub.

Re. 32,511

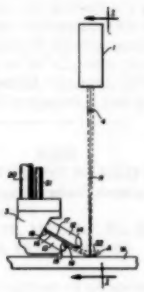
METHOD AND APPARATUS FOR MAKING INSTANTANEOUS SCARFING CUTS

Stephen A. Engel, Granite Springs, and Ronald E. Fuhrhop, West Nyack, both of N.Y., assignors to L-TEC Company, Florence, S.C.

Original No. 4,084,988, dated Apr. 18, 1978, Ser. No. 789,720, Apr. 25, 1977. Continuation-in-part of Ser. No. 684,833, May 10, 1976, Pat. No. 4,038,108. Application for reissue Apr. 11, 1980, Ser. No. 139,450

Int. Cl.[4] B23K *7/08*

U.S. Cl. 148—9.5 11 Claims



11. A method for initiating a gas deseaming process on a workpiece by melting of the surface of the workpiece to ignition temperature by means of a point heat source, characterized in that the point heat source is given a motion parallel to the orifice of the planing nozzle in direct connection to this, oxidizing gas simultaneously flowing through the planing nozzle.

Re. 32,512

METHOD FOR PRODUCING FOIL ELECTRODES FOR ELECTROLYTIC CAPACITOR

Nobuyoshi Kanzaki, Jyoyo; Kenji Toyama, Uji; Katsutoshi Nakano, Jyoyo; Ryoichi Shimatani, Hirakata, and Fumio Kudo, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kodoma, Japan

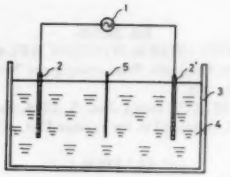
Original No. 4,276,129, dated Jun. 30, 1981, Ser. No. 162,738, Jun. 25, 1980. Application for reissue Jun. 28, 1982, Ser. No. 393,033

Int. Cl.[4] **C25D** *11/08, 11/10*

U.S. Cl. 204—58 **4 Claims**

4. In the method for producing electrodes for use in aluminum electrolytic capacitor whose effective surface area is enlarged by electrochemically etching aluminum foil in an aqueous solution including hydrogen chloride and at least one additive capable of anodizing said aluminum foil with electric power supplied in alternating current, an improvement characterised in that:

the concentration of the hydrogen chloride in said solution is set at a range between 0.5 N and 3.5 N, the concentration of said additive is set at a range between 0.001 mole/liter and 0.4 mole/liter, the frequency of said alternating current power supply is ranging from 5 Hz to 120 Hz and its current density



is ranging from 0.1 A/cm² to 0.6 A/cm², while the temperature of said solution is being maintained at 25° C.–60° C., said additive being acetic acid or a salt thereof.

PLANT PATENTS

GRANTED SEPTEMBER 29, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,024

NECTARINE TREE 51G110S

Chris F. Zaiger, 537 Rosemore Ave., Modesto, Calif. 95351

Filed Dec. 16, 1985, Ser. No. 809,137
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—41 **1 Claim**

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, characterized by its large size, vigorous, upright growth, a productive and regular bearer of large size, firm, yellow flesh, clingstone fruit with attractive red skin color and good eating quality; the tree is further characterized in comparison with May Grand Nectarine (U.S. Plant Pat. No. 2,794) by producing fruit that ripens 5 to 6 days earlier and being able to produce fruit with more uniform size throughout the tree, especially on smaller fruiting wood in the lower portion of the tree.

6,025

PEACH TREE (B-41871)

Leo Balakian, 41871 Rd. 52, Reedley, Calif. 95654, assignor to Leo Balakian and Rosalie Balakian, both of Fresno, Calif.

Filed Sep. 5, 1985, Ser. No. 772,934
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree, substantially as illustrated and described, characterized—in comparison to the Maycrest—by more vigorous tree growth; by above average uniformity of fruit distribution on the tree; by more advancement of the external color of the fruit in the early stages of ripening; and by ripening to picking maturity of the semi-freestone fruit, approximately six days earlier.

6,026

RHODODENDRON PLANT—SAMMETGLUT VARIETY

Hans Hachmann, Barmstedt in Holstein, Fed. Rep. of Germany, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Jul. 17, 1984, Ser. No. 631,718
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—57 **1 Claim**

1. A new and distinct variety of Rhododendron plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of:

(a) a well-branched, compact plant of good vigor,

(b) very attractive blossoms having a clean, bright red color, which contrasts handsomely with the white stamens,

(c) winter hardiness to −25° C., and

(d) an aptitude for rooting from mature cuttings which compares favorably with presently known varieties.

6,027

GERANIUM PLANT NAMED MARY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,167
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Mary, as described and illustrated, and particularly characterized by its pure white flower color, with the petals being variegated with pink; floriferous, strong growth habit; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; medium green foliage; medium early flowering; and ease of propagation and good rooting habit.

6,028

GERANIUM PLANT NAMED DOLLY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,166
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Dolly, as described and illustrated, and particularly characterized by its light coral-red flower color fringed with white; ease of propagation and good rooting habit; very early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; and compact, self-branching growth habit.

6,029

GERANIUM PLANT NAMED VICKY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,168
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Vicky, as described and illustrated, and particularly characterized by its salmon-pink flower color variegated with deep salmon-red on upper petals; medium early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; vigorous, self-branching growth habit; and by its ease of propagation and good rooting habit.

6,030

GERANIUM PLANT NAMED HONEY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,169
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Honey, as described and illustrated, and particularly characterized by its salmon-rose flower color with dark salmon-red variegation; light green foliage; early flowering and very floriferous habit; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; very compact, self-branching growth habit; and, by its ease of propagation and good rooting habit.

PATENTS

GRANTED SEP. 29, 1987

ERRATA

For CLASS	See PATENT NO.
437-005	4,696,092
437-176	4,696,093
437-023	4,696,094
437-078	4,696,095
437-193	4,696,097
437-187	4,696,098
060-489	4,696,148
604-085	4,696,164
192-003	4,696,222
279-121	4,696,513
439-011	4,696,523
439-197	4,696,524
439-069	4,696,525
439-068	4,696,526
439-053	4,696,527
439-160	4,696,528
439-267	4,696,529
439-266	4,696,530
439-851	4,696,531
439-863	4,696,532
350-255	4,696,566
252-062	4,696,725
512-008	4,696,766
424-118	4,696,794
430-271	4,696,820
437-225	4,696,833
437-225	4,696,834
220-462	4,696,840

PATENTS

GRANTED SEPTEMBER 29, 1987

GENERAL AND MECHANICAL

4,696,064

NECKTIE AND METHOD OF TYING

Robert A. Morwood, 722 N. Jefferson, Mason City, Iowa 50401

Filed Apr. 20, 1987, Ser. No. 40,136
Int. Cl.[4] A42B *5/00*
U.S. Cl. 2—144 **4 Claims**

1. A necktie having front and rear sections with each section having front and rear faces, the front face of the front section and the rear face of the rear section being arranged to face in the same direction when the tie is lying flat,

said front section being substantially 3/5 of the total length of said tie and the rear section being substantially 2/5 of the total length of said tie,

said front section and said rear section each comprising a tapered point at its widest end and secured together at their narrow ends by a fastening means,

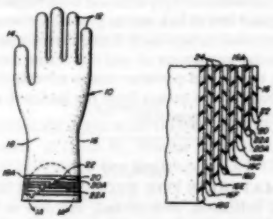
said fastening means being mounted on the narrow end of each of the front and rear sections and cooperating to secure these sections together and forming an index point for aiding in positioning of the tie at the nape of the collar of a user.

4,696,065

PEEL AWAY MULTI-LAYER GLOVES

Barbara Elenteny, 8140 Surrey La., Oakland, Calif. 94605

Filed Mar. 13, 1987, Ser. No. 25,518
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—168 **8 Claims**



1. A glove adapted to be worn on a human hand and adapted for use in medical procedures subject to bacterial contamination, said glove comprising:

an inner layer of impervious elastomeric material;

an outer layer of impervious elastomeric material covering said inner layer; and a plurality of additional layers of elastomeric material between said inner and outer layers, each adjacent pair of layers being separated by said release means; and

release means between said layers for enabling a wearer of the glove to remove and strip away said outer layer whenever it becomes contaminated so that a clean inner layer will be exposed;

said inner layer and each successive adjacent layer having a longer wrist portion than the next outermost layer, so that all multiple layers of said glove have a different length and are easily distinguishable from each other.

6. A method for making a multi-layered medical glove comprising the steps of:

(1) providing hand-shaped mold;

(2) dipping said mold into a body of liquid elastomeric material;

(3) withdrawing said mold when a first layer of said elastomeric material has become adhered to it;

(4) drying said first layer of elastomeric material on said mold;

(5) applying a release agent to said first layer on said mold;

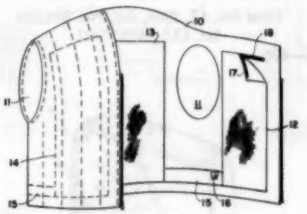
(6) dipping said mold with said first layer into said elastomeric material and repeating steps 2–4 for as many layers as desired for said glove; and removing said glove from said mold, each successive dipping forming a layer that is shorter than the layer directly under it.

4,696,066

HEATED COAT LINER

Joyce A. Ball, and Glen W. McKettrick, both of 7031 Mills Ave., Jacksonville, Fla. 32211

Filed Sep. 15, 1986, Ser. No. 907,235
Int. Cl.[4] A41D *27/02*
U.S. Cl. 2—272 **8 Claims**



1. A coat liner comprising a back panel, a left front panel and a right front panel, each said panel adapted to be attached to the inside of a coat, each said panel including a layer of fire retardant fabric having two surfaces and a pattern of electric resistance heating wire attached to one said surface thereof, a layer of fabric having two sides and coated on one side with a polyfluorocarbon resin, said resin coating lying against said heating wire, and a layer of coating fabric lying against the other of said sides of said fabric, and an electrically insulated wire connecting said heating wire to a plug attachable to a source of electric power.

4,696,067

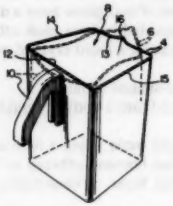
WOMEN'S URINAL FOR USE IN ERECT POSITION

Marylou Woodward, 3255 Randall Ave. (Apt. 2H), Bronx, N.Y. 10465

Continuation-in-part of Ser. No. 646,472, Aug. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 614,877, May 29, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 912,668
Int. Cl.[4] A47K *11/00*; **A61B** *5/00*
U.S. Cl. 4—144.1 **11 Claims**

1. A urinal of light, relatively stiff material capable of facilitating hygienic and convenient urination by a female person in an erect position, comprising a substantially flat bottom of

substantially rectangular shape and having a front to back length not more than 50% greater than its width and corners sufficiently round to eliminate sharp edges, and having also side walls integral with said bottom upstanding therefrom to a height exceeding the front to back length of the bottom, so as to provide a capacity of between one-half liter and one liter, said sidewalls being composed of lateral walls and front and rear end walls joined together with said bottom to form a



container having a rim of approximately rectangular contour and a width of at least 8 cm, the stiffness of said container at said rim and the width of said rim being sufficiently great to deform a female user's thighs to an extent which spreads her labia apart out of the way of a stream of urine discharged by her urethra to minimize interference of the labia with urination, and reinforcement means for giving the rim more stiffness than the wall portion below the rim.

4,696,068

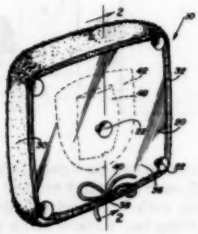
SHOWER WALL AND BATHTUB MOUNTED BACK WASHER

Mary B. Kenner, 1 Mile Course, Kings Mill, Williamsburg, Va. 23185

Filed Jul. 17, 1986, Ser. No. 886,334

Int. Cl.[4] A47K *7/02*

U.S. Cl. 4—606 **4 Claims**



1. A back washer for mounting on the wall of a shower bath, bathtub or the like, comprising a pad of resilient material having characteristics that prevent it from absorbing water, means mounting the pad from a supporting surface and a fabric cover for the pad having structural characteristics enabling it to absorb water and enabling removal and replacement of the cover so that the back or other inaccessible surface areas of the body of a person can be brought into contact with the cover for washing such surface areas when moved in relation to the cover and pad while being retained against the cover, said pad being constructed of foam plastic material and including a water proof covering mounted thereon, said means mounting the pad including a substantially rigid backing panel having a perimeter generally coinciding with the perimeter of the pad, and a plurality of suction cups mounted on the panel for mounting the panel on a supporting surface such as the vertical wall of a shower bath or the inclined wall of a bathtub, said fabric cover also engaging the panel to retain the panel, pad and cover in assembled relation, said cover including a front panel overlying and conforming generally with the dimensional characteristics of the pad and a peripheral flange overlying the periphery of the pad and a drawstring in a hem engaging the periphery of the panel and disposed inwardly of the periphery to retain the pad and cover on the panel, and a pocket on the interior of the front panel of the cover for receiving material to be applied to the surface areas of the body engaged with the cover.

4,696,069

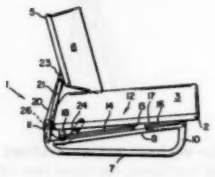
SOFA BED

Robert P. Crosthwaite, Lethbridge, Canada, assignor to Ducan Steel Benders Ltd., Lethbridge, Canada

Filed Jun. 2, 1986, Ser. No. 869,514

Int. Cl.[4] A47C *17/04*

U.S. Cl. 5—37 R **7 Claims**



1. A sofa bed comprising generally U-shaped base means for resting on a floor, said base means including substantially vertical front and rear arm means; rearwardly inclined track means extending between said front arm means and said rear arm means; seat frame means supported by said base means; back frame means supported by said base means and by said seat frame means; first link means pivotally connected to the top end of said front arm means and to said seat frame means between the front end and middle thereof; second link means rigidly connected to the rear end of said seat frame means, and slidably and pivotally connected to said track means, whereby said seat frame means can be moved from a rearwardly inclined sofa position to a horizontal bed position by lifting the front end of said seat frame means, rotation of the first link means from a rearwardly and downwardly extending position to a forwardly extending, substantially horizontal position, and sliding of said second link means forwardly along said track means; third generally C-shaped link means rigidly connected at one end to the bottom end of said back frame means and pivotally connected to said seat frame means at a location forwardly of said second link means for normally supporting said back frame means steeply inclined with respect to said seat frame means; and fourth link means pivotally connected to said rear arm means and to said back frame means near the bottom thereof, whereby movement of said seat frame means from the sofa position to the bed position causes corresponding movement of the back frame means from the inclined, sofa position to the horizontal, bed position.

4,696,070

UNDERMATTRESS FOR RECLINING FURNITURE

Hugo Degen, Seltisberg, Switzerland, assignor to Marpal AG, Switzerland

Filed Dec. 23, 1985, Ser. No. 812,409

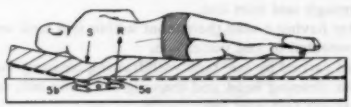
Claims priority, application Switzerland, Dec. 28, 1984, 6218/84

Int. Cl.[4] A47C *23/06*

U.S. Cl. 5—238 **5 Claims**

1. Undermattress for reclining furniture, having a frame which is equipped with spring bridges which are mounted at preselected distances in the longitudinal side sections of the frame and which have, in turn in each case, at least one cross-slat, further having adjustable supporting means arranged between a head part and a body support part of said undermat-

tress wherein the said supporting means comprises two rigid rocking cradles (2) which are arranged at the inner surfaces of said longitudinal side sections (1) each of which is at a central location pivotably suspended about a swivel axis (A) which runs transversely to the longitudinal axis of the reclining furniture at the transitional area from the shoulder (S) to the upper



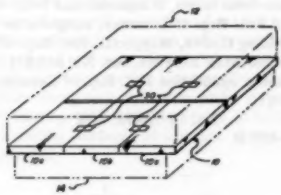
rib part (R) of a reclining person and which said axis is located in the upper cradle area, and wherein each said rocking cradle carries at its two ends a pair of support bodies (*5a*, *5b*) which accommodate said spring bridges for supporting the shoulder part and the upper, side rib part of the reclining person in its side position.

4,696,071

DECK FOR SUPPORTING A FLOATATION SLEEP SYSTEM BLADDER

Philip J. Santo, 12 Mountain Rd., Rochester, N.Y. 14625

Filed Jul. 25, 1986, Ser. No. 889,231
Int. Cl.[4] A47C *27/08, 19/00*
U.S. Cl. 5—451 **6 Claims**



1. A deck of a size and strength sufficient to support a fluid-filled bladder of a floatation sleep system, said deck adapted to be supported on a pedestal, said deck comprising:

a plurality of rigid members; and

means for separately encasing said rigid members as a unit hingeable, between such members, said encasing means including a decorative, flexible material having a plurality of sealable pockets for receiving said plurality of rigid members respectively, whereby such unit is readily foldable to a compact configuration for handling and transport, and unfoldable to provide support for a fluid-filled bladder.

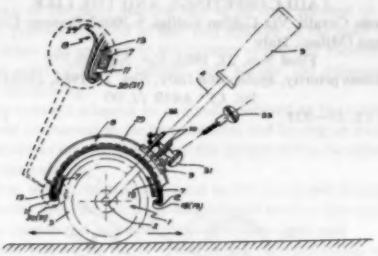
4,696,072

SPATTER GUARD FOR PAINT ROLLERS

Owen R. Cormack, 13 Leeds St., Rhodes NSW 2138, and James H. Keane, 6/12 Garrick St., Coolangatta Qld 4225, both of Australia

PCT No. PCT/AU85/00250, § 371 Date Oct. 21, 1985, § 102(e) Date Oct. 21, 1985, PCT Pub. No. WO85/02564, PCT Pub. Date Jun. 20, 1985
PCT Filed Dec. 5, 1984, Ser. No. 773,008
Claims priority, application Australia, Dec. 6, 1983, PG2719
Int. Cl.[4] B05C *17/04*
U.S. Cl. 15—248 A **6 Claims**

1. A paint roller spatter guard comprising an arcuate shaped trough member having a pad of absorbent material fixed therein, said trough member being fixed in a cradle secured to a support member fixed by a clamp to a paint roller assembly whereby the spatter guard is spaced from but embraced by part of the roller and is positioned between the roller and the roller handle, said pad of absorbent material being supported on a flexible backing strip, said flexible backing strip having longitu-



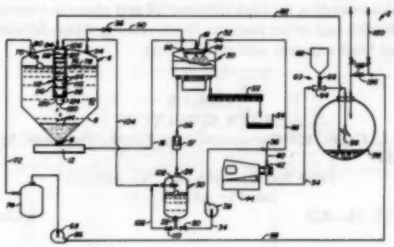
dinal edges which engage in channel members on each longitudinal edge of said trough member.

4,696,073

RECYCLED LIQUID CLEANING SYSTEM

William G. Urbania, Stockton, Calif., assignor to Industrial Innovations, Inc., Stockton, Calif.

Continuation-in-part of Ser. No. 662,880, Oct. 19, 1984, Pat. No. 4,616,377, and a continuation-in-part of Ser. No. 657,284, Oct. 2, 1984, Pat. No. 4,619,015. This application Aug. 19, 1985, Ser. No. 767,006
The portion of the term of this patent subsequent to Oct. 14, 2002, has been disclaimed.
Int. Cl.[4] B08B *9/08*
U.S. Cl. 15—302 **25 Claims**



12. A system for cleaning a dirty surface comprising:

a pressure vessel partially filled with a cleaning liquid;

vacuum means for drawing a partial vacuum within the pressure vessel in a partial vacuum region above a free surface of the cleaning liquid;

means for removing liquid from the main vessel and directing the liquid against the dirty surface;

means for transferring cleaning liquid and dislodged contaminants from a cleaning liquid and dislodged contaminants collection point associated with the dirty surface to the main vessel; and

said liquid removing means including:

a solids separator, including an inlet, connected to a bottom region of the main vessel, a liquid outlet and a solids outlet;

a centrifuge having a centrifuge inlet fluidly connected to the solids separator liquid outlet, a centrifuge liquid outlet and a centrifuging solids outlet;

a pressure pump; and

a makeup tank connected to a liquid outlet of the solids separator having a first outlet fluidly connected to the inlet of the pressure pump and a second outlet fluidly connected to the partial vacuum region.

4,696,074

MULTI-PURPOSE HOUSEHOLD APPLIANCE PARTICULARLY FOR CLEANING FLOORS, CARPETS, LAID CARPETINGS, AND THE LIKE

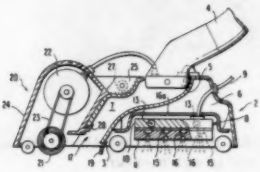
Alfredo Cavalli, Via Galileo Galilei, 9-20060 Pessano Con Bornago (Milan), Italy

Filed Nov. 21, 1985, Ser. No. 799,772

Claims priority, application Italy, Nov. 21, 1984, 23851/84[U]

Int. Cl.[4] A44B *11/00*

U.S. Cl. 15—321 **1 Claim**



1. A household appliance for cleaning substantially flat surfaces such as floors, carpets and the like comprising a working head, a handle connected to said working head, a steam generator mounted in said working head in communication with a water supply conduit and a vacuum chamber having an air-liquid suction port located in said working head in communication with a vacuum conduit comprising a portion of said handle, said steam generator being comprised of two superimposed metal plates having electrical heating means incorporated in at least one of said plates, a vaporizing chamber disposed in one of said plates in communication with said water supply conduit, steam passages located between said plates in communication with said vaporizing chamber and a plurality of holes extending through the other of said plates in communication with said steam passages for dispensing steam outwardly of said head adjacent said suction port.

4,696,075

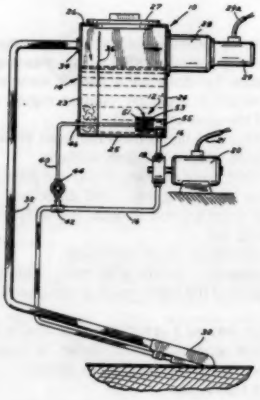
FILTER STRUCTURE

Dale L. Grave, 125 Queensland Lane North, Plymouth, Minn. 55447

Filed Jan. 21, 1986, Ser. No. 820,168

Int. Cl.[4] A47L *11/30*

U.S. Cl. 15—321 **6 Claims**



1. A recycling surface cleaning apparatus embodying a nonclogging filter structure, having in combination,

a reservoir tank of cleaning fluid of a surface material cleaning apparatus,

an outlet line withdrawing said cleaning fluid from said tank and passing the same to a cleaning head,

an inlet line from said cleaning head to said tank,

means carried by said tank withdrawing cleaning fluid from said cleaning head and drawing the same into said tank through said inlet line,

a filter having a wall thereabout within said tank and being connected to said outlet line,

means carried by said tank withdrawing cleaning fluid from said cleaning head and drawing the same into said tank through said inlet line,

means from said outlet line supplying fluid therefrom into the body of fluid within said filter under a greater pressure than the withdrawal of said cleaning fluid from said tank by said outlet line causing a counterflow motion of fluid within said filter,

whereby said counterflow motion causes fluid to pass through portions of the wall of said filter creating adequate motion about said wall to repel interfering contaminants in the cleaning fluid in said tank from collecting upon and clogging said wall of said filter and thus permitting cleaning fluid to be passed through the filter and be withdrawn from said tank.

4,696,076

VACUUM CLEANER NOZZLE

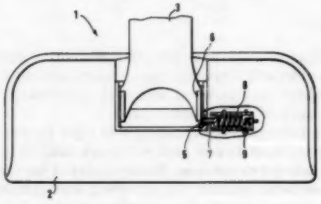
Heinz-Jürgen Ahlf, Bergisch-Gladbach; Wieland Gühne, Remscheid; Hans-Peter Simm, Wuppertal, and Peter Wulf, Ennepetal, all of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 845,174

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 8509150[U]

Int. Cl.[4] A47L *9/02*

U.S. Cl. 15—415 R **5 Claims**



1. A vacuum cleaning nozzle for attachment to vacuum generating means, the vacuum cleaning nozzle comprising:

a housing;

an attachment stub for attachment to the vacuum generating means, said attachment stub being pivotally mounted in said housing for movement in a plane through an angle between a first angular position and a second angular position defining an end region of said movement;

detent means arranged on said nozzle so as to interface between said housing and said attachment stub for latching said attachment stub to said housing when the latter is pivotally moved to said second angular position so that a swivelling of said attachment stub causes said housing to be swivelled therewith; and,

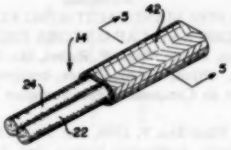
said detent means including a movable member movably journalled in said housing so as to be movable transversely to said plane for latching said stub to said housing; and, cam means conjointly defined by said movable member and said attachment stub responsive to a force tending to move said attachment stub out of said second position thereby unlatching said stub from said housing.

4,696,077

HANDLE ASSEMBLY FOR LUGGAGE CASE

Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

Filed May 29, 1986, Ser. No. 868,099
Int. Cl.[4] A47B 95/02
U.S. Cl. 16—125 6 Claims



1. A handle assembly for a luggage case of the type in which a handgrip element is attached to the body of the luggage case, the improvement of said handgrip element comprising:

a flexible, heavy cord material formed into at least two longitudinal and closely spaced rows which provide a substantial central portion for said handgrip element,

an outer piece of material having the characteristics to complement said luggage case enwrapped around said at least two rows of said cord material and having longitudinal edges secured along a longitudinal centerline of and between said at least two rows in at least said central portion which forms a pliable sturdy said central portion, said outer piece of material consisting of at least two sections, each section adapted to enwrap a different longitudinally disposed row of said cord of material, whereby the longitudinal edges of each section substantially mates with that of the other along said centerline, and

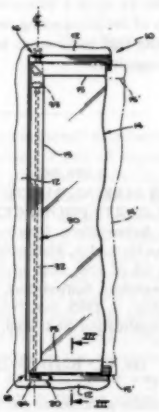
means for securing said mating surfaces of each section to opposed mating surfaces along said centerline of said center portion.

4,696,078

COMBINED ADJUSTABLE DOOR HINGE PIN SOCKET AND ADJUSTABLE TORQUE ROD ANCHOR DEVICE

Michael E. Stromquist, Encino, Calif., assignor to Anthony's Manufacturing Company, Inc., San Fernando, Calif.

Filed May 6, 1982, Ser. No. 375,754
Int. Cl.[4] E05F 1/08
U.S. Cl. 16—301 4 Claims



1. A torque rod adjustment device for use in a torsionally operated door assembly having a door that swings on hinges about a vertical pivot axis on one side of the door, and a surrounding cabinet wherein a torque rod is positioned along the pivot axis of the door and has one of its ends secured to the door to prevent rotation of said end relative to the door and has its other end secured to the cabinet to prevent rotation of this end relative to the cabinet, said torque rod adjustment device comprising:

a base member adapted to be fixedly secured to the cabinet;

a cover connected to the base member and having an anchor therein to receive the end of the torque rod to be secured to the cabinet;

a worm wheel rotatively housed in the cover and having a central aperture adapted to matingly receive the end of the torque rod in a non-rotative relationship; and

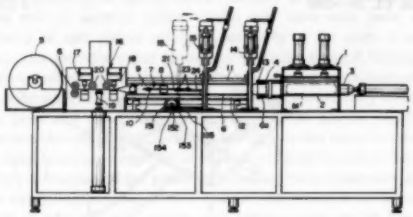
a worm housed by the cover in engaging relationship with the worm wheel and adapted to be selectively turned so as to adjust the torque of the torque rod.

4,696,079

APPARATUS FOR AUTOMATICALLY STUFFING MEAT IN A CASING

Keiichi Kawai; Setsuo Yasuda, and Zenichiro Sakaime, all of Osaka, Japan, assignors to Futabadenki Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 29, 1986, Ser. No. 857,199
Claims priority, application Japan, May 8, 1985, 60-97334
Int. Cl.[4] A22C 11/02
U.S. Cl. 17—33 1 Claim



1. An apparatus for automatically stuffing meat in a casing, the apparatus comprising:

a meat extruder including a filling nozzle;

means for supplying a continuous band of casing;

a carrier means for carrying the casing from the supplying means to the filling nozzle, wherein the carrier means includes a stop means whereby the casing is secured to the carrier means so as to effect the unitary movement thereof;

a casing holder means for holding the open end of the casing so as to assist the casing to ride on an open end of the filling nozzle;

a first cutting-and-fastening means located at a casing supply side; and

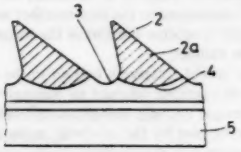
a second cutting-and-fastening means located at a casing outlet side, wherein the second device is adjustable with respect to the first device, the second cutting-and-fastening device including a cam plate having a cam face whereby the stop means is caused to assume a locking position and an unlocking position with respect to the casing against the carrier means.

4,696,080

METALLIC WIRE FOR SPINNING MACHINERY AND THE METHOD OF MANUFACTURING THE SAME

Ritsuji Nakamura, Daito, Japan, assignor to Kanai Juyo Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed Dec. 30, 1985, Ser. No. 814,722
Int. Cl.[4] D01G *15/12*
U.S. Cl. 19—114 3 Claims



1. Metallic wire for spinning machinery, said metallic wire comprising:

hard drawn steel wire or alloy steel wire having a plurality of quench hardened teeth spaced apart from one another by respective valley parts; and

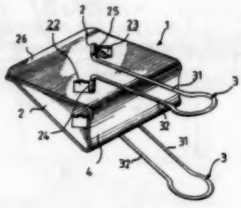
said wire having boundaries defined thereon extending between adjacent ends of the valley parts at respective roots of the teeth which are arcuate and convex away from the teeth, said quench hardened teeth being on one side of the boundaries, and the valley parts being on the other side of said boundaries and having a hardness which is less than the hardness of said quench hardened teeth.

4,696,081

CLIP RESILIANT

Down W. Yen, No. 654, Wu Chia 2nd Road, Feng Shan City, Kaohsiung Hsine, Taiwan

Filed Jan. 6, 1987, Ser. No. 870
Int. Cl.[4] B42F *1/04*
U.S. Cl. 24—558 1 Claim



1. An improved clip structure comprising:

a resilient metal sheet forming an upper face, a lower face and a back portion connecting said upper face and said lower face, the upper and lower face normally contacting each other at the front ends thereof;

two pairs of hinges with a first pair of hinges on said upper face and a second pair of hinges on said lower face, said first and second pairs of hinges respectively defining hinge axes for pivotal movement lying parallel to said respective upper and lower faces set diagonally on said upper and lower faces relative to said back portion so that one hinge of each of said two pairs is closer to said back portion than the other;

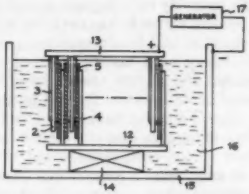
a first and a second shank, said first shank being positioned on said upper face and second shank being positioned on said lower face, each of said shanks having a longer arm and a shorter arm, the ends of said longer arms having portions pivotally retained by the hinges adjacent to the edges of the clip structure and said shorter arms having portions pivotally retained by the hinges adjacent to the back portion of the clip structure, said shanks being pivotable 90 degrees from an extending upright position beyond said back portion about the axes respectively formed by said first and second pairs of hinges to a position substantially parellel to said back portion.

4,696,082

METHOD FOR MANUFACTURING ELECTROLYTIC CAPACITORS AND CAPACITORS THUS OBTAINED

Robert Fonfria, Dijon; Marie P. Risbet, Ste. Suzanne, and Jean L. Zattara, Dijon, all of France, assignors to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France

Filed Jun. 9, 1986, Ser. No. 871,791
Claims priority, application France, Jun. 11, 1985, 8508809
Int. Cl.[4] H01G *9/00*
U.S. Cl. 29—25.42 8 Claims



1. Method for manufacturing electrolytic capacitors, wherein the method comprises at least the following steps:

a. obtaining at least one capactive strip by winding on a spool an anodic foil, a cathodic foil and an electrolyte support;

b. schooping of the lateral faces of the strip so as to carry out anodic and cathodic armatures;

c. removing the capacitive strip from the wheel;

d. delimiting capacitive blocks from said capacitive strip by providing notches or recesses in the strip to partially sever the strip but leave intact its anodic armature;

e. subjecting the capacitive blocks to an anodic oxidation to restore the dielectric of the anodic foils;

f. impregnating the said electrolyte support by an electrolyte;

g. putting in place the capacitive blocks on connecting means intended to form the electrodes of the capacitors;

h. coating the blocks with a protective material so as to allow the parts of the connecting means to protrude;

i. form shaping the said parts so as to constitute the electrodes of the capacitors.

4,696,083

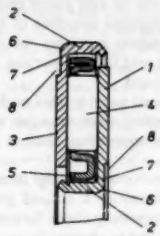
METHOD FOR MAKING MACHINE PARTS AND MACHINE PARTS PRODUCED THEREBY

Armin Olschewski, Schweinfurt; Manfred Brandenstein, Eussenheim; Hermann Hetterich, Heidenfeld, and Heinrich Kunkel, Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Schweinfurt, Fed. Rep. of Germany

Filed Nov. 7, 1985, Ser. No. 795,823
Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3440961
Int. Cl.[4] B21D *53/12*
U.S. Cl. 29—148.4 C 1 Claim

1. A method for making hardened parts such as a rotary disk for axial roller bearings comprising an annular ring shaped body and a circumferentially extending flange extending angularly relative to the body, consisting of the steps of forming the

disk to the desired shape in the soft state, densifying only one annular ring shaped section of the ring shaped body adjacent



the flange by cold rolling or pressing, and thereafter hardening the entire disk.

4,696,084

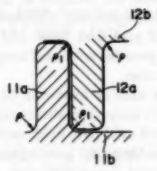
METHOD FOR FORMING SCROLL MEMBERS USED IN A SCROLL TYPE FLUID MACHINE

Takahisa Hirano; Shoji Fukami; Yasuharu Maruiwa, all of Nagoya; Takuyuki Itoh; Tamio Sugimoto, both of Aichi; Tetsuo Ono, Nagoya, and Masatoshi Mukai, Aichi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Division of Ser. No. 745,393, Jun. 14, 1985. This application Feb. 26, 1986, Ser. No. 833,180

Int. Cl.[4] B23P *15/00*

U.S. Cl. 29—156.4 R **1 Claim**



1. A method for forming scroll members used in a scroll type fluid machine comprising a pair of engaged scroll members each including a side plate and a spiral lap uprightly disposed on an inside surface of said side plate; when said scroll members are relatively revolved, a fluid volume in sealed chambers defined by said pair of engaged scroll members being varied, so that a pressure of the fluid in said sealed chambers is thereby varied in order to discharge a gas therefrom, said method being characterized by roughly working each corner of an inner end base portion of said lap and said inside surface of said side plate of said scroll member so as to form a complete round having a relatively large curvature radius which is enough to provide said lap with fatigue strength, by the use of a cutter, and the finishing, at each corner portion, a round having a relatively small curvature radius which does not contact with a tip end portion of said lap of the partner scroll member, by the use of a cutter.

4,696,085

APPARATUS FOR PRESSING TUBULAR PARTS

Karl Sauder, Zurich, Switzerland, assignor to Firma Compat Aktiengesellschaft, Fürstentum, Liechtenstein

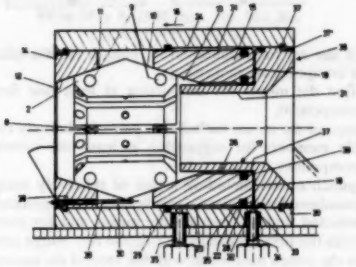
PCT No. PCT/EP83/00024, § 371 Date Oct. 4, 1983, § 102(e) Date Oct. 4, 1983, PCT Pub. No. WO83/02737, PCT Pub. Date Aug. 18, 1983

Continuation of Ser. No. 552,138, Oct. 4, 1983, abandoned. This PCT application Feb. 1, 1983, Ser. No. 882,432

Claims priority, application Austria, Feb. 4, 1982, 424/82

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—237 **7 Claims**



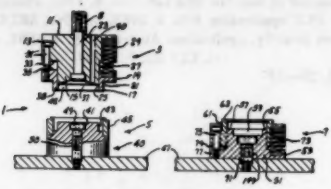
1. An apparatus for pressing tubular parts onto pipes, sleeves or hoses, comprising an external cylinder sleeve and a coaxially inserted tubular part forming an annular cylinder having a base, a plurality of spring-loaded radially adjustable clamping jaws and an annular piston which acts upon said jaws, the interior of said piston enlarged conically at the ends of said jaws, the radially outer boundary surfaces thereof having a corresponding angle of inclination and bearing upon said conical enlargement, and said piston movable hydraulically toward said jaws and returnable hydraulically to its neutral postion, wherein the effective piston area which is acted upon to return the double-acting piston to its neutral position has a size which is only a fraction of the piston area facing away from said jaws and extending parallel to said base which piston area is acted upon to advance said piston, and wherein said piston has its largest cross-sectional area at said end constituting the effective piston area which is acted upon to advance said piston, the end of said piston remote from said jaws engaging in said annular cylinder, wherein said external cylinder sleeve has a free end and extends axially from said cylinder to said free end, a conical ring inserted from said cylinder to said free end, a conical ring inserted permanently coaxially with said piston at said free end of said external cylinder sleeve facing away from said annular cylinder, the inner surface of said conical ring widening conically toward said piston and the outer surfaces of said jaws narrowing conically toward both ends in axial direction, wherein said conical ring and the component formed by said tubular part and said base of said cylinder are fixed to said external cylinder sleeve at both ends thereof by means of lock rings which engage in grooves defined in said external cylinder sleeve, wherein said base of said cylinder is formed integrally with said inserted tubular part, wherein said lock rings are of L-shaped cross-section, one of the legs bearing against the inner wall of said cylinder sleeve and the other leg engaging said groove, and said lock rings are divided at least once in the peripheral direction, the dividing surfaces of said rings running at an acute angle to a radial plane of said lock rings.

4,696,086

DIE SET APPARATUS FOR BADGES

John W. Dickerson, 16480 Burleigh Pl., Brookfield, Wis. 53005

Filed Jan. 22, 1986, Ser. No. 821,474
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—243.52 **13 Claims**



1. A die set for manufacturing badges from a plurality of badge components comprising:

a. first die means for supporting at least one first badge component;

b. second die means including a pair of relatively reciprocable members for supporting at least one second badge component;

c. punch means including a pair of relatively reciprocable members for vertical reciprocation in alignment with a selected first and second die means and for cooperating with the first die means to load the first badge component in the punch means and with the second die means to push the first badge component from the punch means and into assembled relationship with the second badge component; and

wherein:

d. the second die means comprises:

i. a base for supporting the second badge component;

ii. a crimp ring having an end face and adapted to reciprocate on the base, the crimp ring being biased upwardly relative to the base with a first force; and

iii. fastener means for restraining the crimp ring in a predetermined location relative to the base against the first force; and

e. the punch means comprises:

i. a block having an end face;

ii. a punch ring adapted to reciprocate on the block and having an end face adapted to abut the crimp ring end face, the punch ring being biased downwardly relative to the block with a second force that is less than the first force; and

iii. fastener means for restraining the punch ring on the block in a predetermined location relative thereto against the second force.

4,696,087

MAGNETIC TAPE CASSETTE ASSEMBLING METHOD AND APPARATUS

Akira Mizuta, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 22, 1986, Ser. No. 899,359
Claims priority, application Japan, Sep. 5, 1985, 60-194745
Int. Cl.[4] B23P *11/00, 19/00*
U.S. Cl. 29—434 **6 Claims**

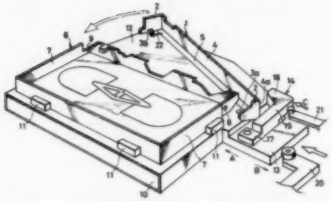
1. A method of assembling a magnetic tape cassette comprising a substantially L-shaped guard panel which has first and second supporting shafts formed respectively at both end pieces thereof and is adapted to cover an opening formed in the front longitudinal part of said magnetic tape cassette, said first and second supporting shafts being inserted respectively into a first hole formed in the upper half case and a second hole formed by the upper and lower half cases, said method comprising the steps of:

positioning said guard panel in front of a front, longitudinal part of said upper half case and inclined with respect to said front part of said upper half case substantially in the same plane in such a manner that said first supporting shaft is set beside said first hole while said second supporting shaft is positioned forwardly of said upper half case;

moving at least one of said guard panel and said upper half case in a longitudinal direction of said upper half case so that pushing means regulates the position of said guard panel to cause said first supporting shaft to confront with said first hole; and

swinging said guard panel by said pushing means so that said second supporting shaft engages with said second hole while said first supporting shaft is inserted into said first hole.

3. An apparatus for assembling a magnetic tape cassette comprising a substantially L-shaped guard panel which has first and second supporting shafts formed respectively at both end pieces thereof and is adapted to cover an opening formed in a front, longitudinal part of said magnetic tape cassette, said first and second supporting shafts being inserted respectivly into a first hole formed in an upper half case and a second hole



formed by said upper half case and a lower half case, said apparatus comprising:

a first table for holding said upper half case;

a second table for holding said guard panel, said first table and a surface of said second table for holding said guard panel being adjacent to each other substantially in the same plane; and

pushing means rotatably included on said second table having for embracing at least a corner of said guard panel which confronts with said first hole and having regulating surfaces which are inclined at predetermined angles with respect to a longitudinal direction of said upper half case;

at least one of said first table and said second table being movable in parallel with said longitudinal direction of said upper half case;

wherein, after said at least one of said first table and said secod table is moved to allow said first supporting shaft to confront with said first hole, said pushing means is turnable while pushing said guard panel, to combine said guard panel with said upper half case.

4,696,088

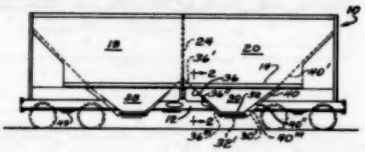
METHOD OF CONVERTING A HOPPER TYPE OF RAIL CAR TO ACCEPT A WIDER OUTPUT GATE

Roy W. Miller, Highland, Ind., assignor to Pullman Rail Leasing Corporation, Chicago, Ill.

Filed Oct. 17, 1986, Ser. No. 919,973
Int. Cl.[4] B21K *7/12*
U.S. Cl. 29—401.1 **4 Claims**

1. A method of converting a hopper type of rail car from a first hopper configuration which includes a hopper having side sills and a center sill and which further includes a first set of outside, end and center slope sheets which are joined to each other and affixed to the body of the hopper at a first set of slope angles, said first set of slope sheets being welded directly to a first mounting flange of a first bottom outlet gate of a first predetermined rectangular size, into a second hopper configuration in which the hopper has outside, end and center slope sheets which are joined to each other and affixed to the body

of the hopper at a second, and different set of slope angles, said second set of slope sheets being affixed directly to a second mounting flange of an outlet gate of a second, and different, predetermined rectangular configuration, said method comprising the steps of: removing said first mounting flange; cutting apart the slope sheets of said first set along at least the lines where they are joined to each other in the region thereof located beneath said side sills; cutting away and removing portions of at least the side extremities of a first opposed pair of slope sheets in said first set and cutting away and removing at least that portion of a second opposed pair of slope sheets in said first set which is located in the region beneath said side sills; replacing the removed portion of said second opposed pair of slope sheets in said first set with new slope sheet portions which have a greater width at their lower ends than the removed portions; locating and positively retaining the second mounting flange in its desired final location relative to the side sills and the center sill; applying force to each of the first opposed pair of slope sheets to cause their lower edges to move divergently from each other and into contact with a first pair of opposed side portions of said second mounting flange; attaching said new slope sheet portions to a second pair of opposed side portions of said second mounting flange; applying heat to said first opposed pair of slope sheets in a horizontal line at an upper portion thereof to relieve the stress introduced therein by said step of applying force; and welding all of said slope sheets in said second set to each other and to said second mounting flange.

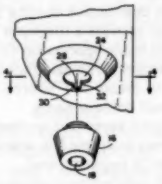


4,696,089

METHOD FOR APPLYING ELASTOMERIC SUPPORT PADS TO RIGID CASINGS

Harvey J. Gjesdal, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 21, 1986, Ser. No. 921,659
Int. Cl.[4] B23P *11/02*
U.S. Cl. 29—451 **4 Claims**



1. A method for mounting elastomeric support pads to a rigid casing comprising:

providing an elastomeric support pad having a body portion, a flange portion and an intermediate post portion,

providing a hole in a rigid casing wall, the wall having a thickness substantially the length of the post portion and the hole having a diameter substantially the diameter of the post portion,

providing said flange portion of the support pad with a rim diameter greater than the hole diameter which is at least partially compressible, and the improvement which comprises:

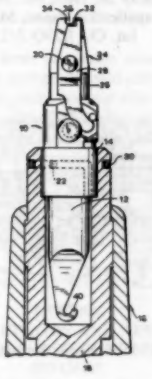
providing a cutout in the casing wall from the edge of the hole, said cutout and intersecting hole edge forming an outwardly angled corner, said cutout and outwardly angled corner providing a lead-in ramp for the flange portion of the pad, and inserting a portion of the rim of the flange under the corner and thereby inside the casing, and turning the pad to force a continuation of the rim of the flange under the hole edge while compressing a small section of the flange until that compressed section is positioned at the cutout whereat the full flange portion is inserted inside the casing wall.

4,696,090

REMOVABLE BLADE ASSEMBLY

Donald L. Gregson, Oxnard, and John J. McGuigan, Studio, both of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed May 8, 1986, Ser. No. 861,206
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—566.4 **20 Claims**



1. A removable blade assembly adapted for use with a termination tool of the type used to connect an electrical conductor to a terminal clip comprising:

a main body with an elongated opening therein defining a cavity,

a slide member slidably connected to said main body and movable between an extended position and a retracted position,

biasing means disposed within said cavity for yieldably biasing said slide member toward said extended position,

said slide member including a first end portion extending into said cavity and operatively engaging said biasing means, and a second end portion opposite said first end portion including means for pressing the electrical conductor into engagement with the terminal clip,

cutting means for severing the electrical conductor upon insertion into the terminal clip, said cutting means including a movable cutting member pivotally mounted to said second end portion of said slide member, said movable cutting member including a first cutting surface adapted to engage the electrical conductor and the cam follower,

said cutting means further including a second cutting surface carried by said slide member and oppositely disposed of said first cutting surface of said movable cutting member,

cam means attached to said main body for cooperation with said cam follower to pivot said cutting member upon movement of said slide member between said extended position and said retracted position to sever the electrical conductor during movement of said slide member toward said retracted position, and

releasable fastening means associated with said main body

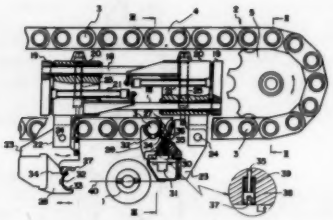
for removably mounting said blade assembly in the termination tool.

4,696,091

AUTOMATIC TOOL CHANGER

Koichiro Kitamura, Takaoka, Japan, assignor to Kitamura Machinery Co., Ltd., Toyama, Japan

Filed May 24, 1985, Ser. No. 737,444
Claims priority, application Japan, May 25, 1984, 59-104805
Int. Cl.[4] B23Q 3/157
U.S. Cl. 29—568 5 Claims



1. An automatic tool changer for a machine tool, comprising:

a machine tool spindle;

a tool magazine comprising a plurality of tool pots which form receptacles for holders fitted with tools, said tool pots being arranged at pre-determined intervals on an endless chain such that an axis of each said tool pot is parallel to the rotational axis of said spindle;

first and second arms arranged in the vicinity of said machine tool spindle such that said spindle is positioned between said first arms and said second arms;

each of said and first and second arms, respectively, being provided with tool gripping means at the outer end thereof nearest said machine tool spindle so as to be capable of separately performing a tool changing operation;

first and second slide bases arranged, respectively, to be moveable in a direction perpendicular to the rotational axis of said machine tool spindle and alternately of said spindle and perpendicular to the axes of said tool pots, and wherein said first and second slide bases are operably coupled to supporting bases having guide bars;

said slide bases being mechanically coupled to said first and second arms, respectively, as to cause corresponding movement of said arms;

first and second rotary plates, respectively, pivotally mounted with respect to said first and second slide bases and mechanically coupled to said first and second arms, respectively, as to cause pivotal motion of said said first and second arms;

first and second cylinder means, respectively, for actuating said first and second slide bases toward and away from each other along said guide bars; and

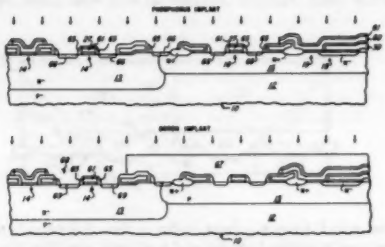
third and fourth cylinder means, respectively, for actuating said first and second rotary plates.

4,696,092

METHOD OF MAKING FIELD-PLATE ISOLATED CMOS DEVICES

Robert R. Doering, Plano, and Gregory J. Armstrong, Houston, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 626,572, Jul. 2, 1984, Pat. No. 4,561,170.
This application Dec. 31, 1985, Ser. No. 815,428
The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.
Int. Cl.[4] H01L 21/263, 29/78, 27/04
U.S. Cl. 437—5 20 Claims



1. A method of making a CMOS twin-well semiconductor device, comprising the steps of:

implanting N impurity into a face of a P type silicon body creating an N well area, and growing oxide over said area,

implanting P impurity into said face using said oxide as a mask to create a P well area, and driving both said N well and P well into said face by heat treatment,

forming a thin oxide and an oxidation mask on said face over both the N well and P well areas and opening holes in both the thin oxide and oxidation mask over a selected area of said P well area, then implanting N+ impurity in said selected area and growing oxide over the selected area to create a buried N+ region beneath such oxide, and implanting lighter doped N regions in capacitor areas of the P well,

applying a first conductive coating over said face and patterning it to provide a capacitor plate and an isolation field-plate, said first conductive coating being insulated from the face in the capacitor area by a thermal oxide thinner than an oxide coating an area beneath said isolation field-plate,

applying a second conductive coating to said face isolated from said first conductive coating by an an insulator, and patterning it to provide a transistor gate and interconnect,

forming sidewall oxide spacers on the edges of said gate,

implanting N impurity into said face in both the N well and P well areas to create N+ source/drain regions, masked by said sidewall oxide spacers,

masking the P well areas and implanting a P impurity into the N well areas to create P+ source/drain regions counterdoping said N impurity, and

applying a third conductive coating over said face isolated from said second and first conductive coatings by an insulator except at a contact area, and patterning the third conductive coating to define an interconnect and a contact.

4,696,093

FABRICATION OF SCHOTTKY BARRIER MOSFETS

James D. Welch, 10328 Pinehurst Ave., Omaha, Nebr. 68124

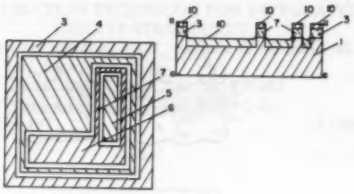
Filed Jun. 9, 1986, Ser. No. 872,147
Int. Cl.[4] H01L 21/441
U.S. Cl. 437—176 4 Claims

1. A single mask/etch method for fabricating MOSFETs comprising:

selecting a silicon substrate;

growing SiO_2 on top of the silicon substrate to a depth appropriate for use as channel oxide under a gate;

etching the SiO_2 to the silicon to form a pattern comprising a source region surrounded by channel and gate SiO_2, which channel and gate SiO_2 is surrounded by a drain region, which drain region is surrounded by a device delineating SiO_2;



depositing chromium to a depth just under that which would cause the chromium on the SiO_2 to be continuous with that on the silicon in the etched source and drain regions so that the resulting metalization is discontinuous; and

annealing the resulting system so that junctions form in the source and drain regions between the deposited chromium and the silicon in the source and drain regions.

4,696,094

PROCESS OF MANUFACTORING AN INDIUM ANTIMONIDE PHOTODIODE

Henry Yves; André Nicollet, and Michel Villard, all of Paris, France, assignors to Thomson - CSF, Paris, France

Filed Nov. 30, 1984, Ser. No. 676,622
Claims priority, application France, Dec. 2, 1983, 83 19317
Int. Cl.[4] H01L *21/18*
U.S. Cl. 437—23 **6 Claims**

1. A method for manufacturing an indium antimonide photodiode having an ionic implantation of the S_{34}^+ isotope of sulphur on a P type indium antimonide substrate which comprises providing an ionic implantation consisting essentially of the S_{34}^+ isotope of sulphur on a P type indium antimonide substrate then in heating the implanted substrate.

4,696,095

PROCESS FOR ISOLATION USING SELF-ALIGNED DIFFUSION PROCESS

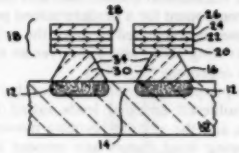
Mammen Thomas, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 27, 1986, Ser. No. 844,908
Int. Cl.[4] H01L *21/31*
U.S. Cl. 437—78 **34 Claims**

1. In a process for fabricating semi-oxide insulated devices, which includes providing a substrate, forming patterned regions of a first conductivity type in a major surface of said substrate, forming an epitaxial layer on said substrate over said major surface, forming a patterned mask layer on said epitaxial layer so as to define openings therethrough to expose portions of said epitaxial layer, removing said exposed portions of said epitaxial layer to define mesa structures which overlie said patterned regions of said first conductivity type, forming regions of a second conductivity type in said substrate between said patterned regions, forming a field oxide between said mesa structures, and forming devices on said mesa structures, wherein said devices are isolated from each other by said regions of said second conductivity type, the improvement which comprises:

(a) employing as said patterned mask a mask consisting essentially of a material selected from the group consisting of (1) a multilayer structure comprising at least two each of alternating layers of silicon dioxide and silicon nitride, (2) silicon nitride and (3) metal;

(b) removing said exposed portions of said epitaxial layer by a partially anisotropic etchant to undercut portions of said



patterned mask, form said mesa structures having side walls, and expose portions of said substrate;

(c) forming an oxide layer on said side walls of said mesa structure and on said exposed portions of said substrate;

(d) removing said oxide layer lying under said openings in said patterned mask to expose corresponding regions of said substrate, said corresponding regions lying between said patterned regions; and

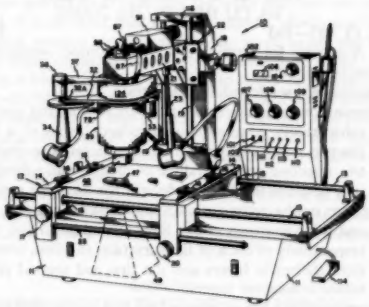
(e) forming said regions of said second conductivity in said corresponding regions through openings in said oxide layer.

4,696,096

REWORKING METHODS AND APPARATUS FOR SURFACE MOUNTED TECHNOLOGY CIRCUIT BOARDS

LaVerne M. Green, Danbury; Adrio L. Vanneni, Redding Ridge, and Ivan K. Pummell, New Milford, all of Conn., assignors to Micro Electronic Systems, Inc., Brookfield, Conn.

Filed Feb. 21, 1986, Ser. No. 832,040
Int. Cl.[4] H05K *3/00*; B23P *19/00*
U.S. Cl. 29—829 **15 Claims**



1. Apparatus for reworking circuit boards carrying surface mounted components by removing a selected solder-connected component from a circuit board and replacing it with a fresh substitute component, comprising

a base,

a column projecting upward from the base and incorporating upwardly elongated track means,

a support arm movably mounted on the track means for up and down traversing movement,

a heat transfer block pivotally supported on the support arm for angular pivoting movement about

a substantially vertical axis, maneuvering means connected to the heat transfer block to govern up and down movement and its angular pivoting movement about said axis,

a board-supporting X-Y table positioned on the base for clamping the circuit board in an adjusted position placing a target component centered on said axis,

a component gripping head anchored to the heat transfer block with a component gripping socket cavity on said axis facing said circuit board,

control means connected to initiate a heating cycle delivering heat via the heat transfer block to the periphery of the target component for a predetermined period of time, and

torquing means connected to drive the gripping head angularly, pivoting about said axis, over an angular sector less then 20 degrees,

whereby the peripheral terminal leads of the target component have their soldered terminal leads raised to solder-melting temperature, and the angular pivoting movement of the component gripping head shears any cement bonding it to the circuit board, facilitating removal of the component from the board.

9. A method for removing a surface mounted target component having a plurality of peripheral terminal leads each individually solder-connected to a different terminal pad on a printed circuit board, comprising the steps of

positioning and clamping the circuit board with the target component intersected by a working axis,

delivering heat to the target component's peripheral solder-connected terminal leads to bring them to solder-melting temperature, while diverting said heat from the central portion of the surface mounted target component,

applying torque to the target component and rotating it through a small angle less than 20 degrees about the working axis,

whereby all solder terminal lead connections are melted and any cement adhesively holding the target component to the circuit board is sheared and the component is released from the board.

4,696,097

POLY-SIDEWALL CONTACT SEMICONDUCTOR DEVICE METHOD

Kevin L. McLaughlin, Chandler, and Thomas P. Bushey, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 8, 1985, Ser. No. 785,414
Int. Cl.[4] H01L *21/283, 21/302*
U.S. Cl. 437—193 **8 Claims**

1. A process for forming a sidewall contact semiconductor device comprising:

providing a semiconductor substrate;

forming on said substrate, and without masking operations, substantially continuous superposed layers of a first dielectric, a first polycrystalline conductor, a second dielectric, a second polycrystalline conductor and a third dielectric, wherein the third dielectric has an outer surface;

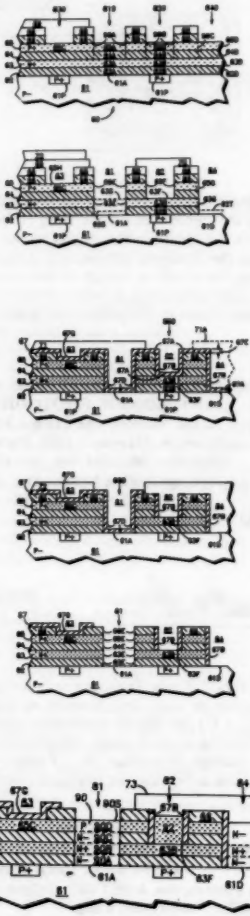
forming on the outer surface a first mask having first, second and third openings above first, second and third portions respectively of each of the substrate, the first, second and third dielectric layers and the first and second polycrystalline conductor layers;

exposing first edge portions of the first and second polycrystalline conductor layers and the second and third dielectric layers beneath the first opening, the second portion of the first polycrystalline conductor layer and second edge portions of the second polycrystalline conductor layer and second and third dielectric layers beneath the second opening, and the third portion of the seond polycrystalline conductor layer beneath the third opening;

conformally covering the structure with a fourth dielectric layer;

covering the fourth dielectric layer with a further mask having a fourth opening encompassing the second opening;

anisotropically etching the portion of the fourth dielectric layer exposed in the fourth opening so as to remove the portion of the fourth dielectric layer above the second portion of the first polycrystalline conductor layer while not substantially removing the portion of the fourth dielectric layer on the second edge portion of the second polycrystalline conductor layer;



covering the fourth dielectric layer with an additional mask having a fifth opening encompassing the first opening;

isotropically etching the portion of the fourth dielectric layer exposed in the fifth opening so as to remove at least the portions of the fourth dielectric layer on the first edge portions of the first and second polycrystalline conductor layers and on the first portion of the substrate;

then forming a single crystal semiconductor pillar above the first portion of the substrate and in contact with the first edge portions of the first and second polycrystalline conductor layers, and forming a polycrystalline conductor

pillar above and in contact with the second portion of the first polycrystalline conductor layer;

forming a device in the single crystal semiconductor pillar; and

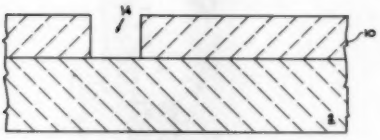
providing electrical connections to the third portion of the second polycrystalline conductor layer, the single crystal semiconductor pillar and the polycrystalline pillar.

4,696,098

METALLIZATION TECHNIQUE FOR INTEGRATED CIRCUIT STRUCTURES

Yung-Chau Yen, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jun. 24, 1986, Ser. No. 878,093
Int. Cl.[4] H01L *21/306*; B44C *1/22*
U.S. Cl. 437—187 **23 Claims**



1. An improved process for forming one or more metal strips on an integrated circuit structure by wet etching of a metal layer which comprises:

(a) forming an intermediate layer over said integrated circuit structure;

(b) forming slots in said intermediate layer;

(c) forming a metal layer of non-uniform thickness over said intermediate layer; and

(d) wet etching said metal layer sufficiently to remove all metal in said slots while retaining metal on said intermediate layer between said slots to form said desired one or more metal strips.

4,696,099

METHOD OF PRODUCING A MAGNETIC HEAD

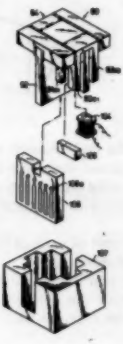
Hiroshi Matsunaga, and Shinichi Morita, both of Tokyo, Japan, assignors to TEAC Corporation, Musashino, Japan

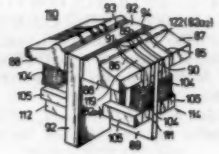
Filed Aug. 8, 1986, Ser. No. 894,799
Claims priority, application Japan, Aug. 19, 1985, 60-181541
Int. Cl.[4] G11B *5/127*
U.S. Cl. 29—603 **6 Claims**

1. A method of producing a magnetic head for a plurality of channels, said magnetic head comprising a plurality of head pairs each of which corresponds to one of said plurality of channels and comprises a write head and a read head aligned in a tape transporting direction in which a magnetic tape is transported, said plurality of head pairs being aligned in a direction perpendicular to the tape transporting direction, a write head and a read head of each head pair being isolated by a center shield and center spacers, write heads and read heads of two mutually adjacent head pairs being isolated by a channel shield and channel spacers, said method comprising the steps of:

forming a reference core block having right and left side surfaces which are finished with a high accuracy so that a distance between said right and left side surfaces is accurately equal to a predetermined value and a degree of parallelism of said right and left side surfaces is accurate, said reference core block integrally comprising legs which are used to finally form respective one core halves of a write head and a read head of each head pair;

forming a core assembly by connecting a first side core block and a second side core block to said right and left side surfaces of said reference core block, each of said first and second side core blocks integrally comprising legs which are used to finally form respective other core halves of the write head and the read head of each head pair, said core assembly comprising gaps of the write heads and the read heads of said plurality of head pairs at said right and left side surfaces of said reference core block;





forming a core-shield-spacer assembly by fitting between the cores of said core assembly said center shield and said center spacers so as to isolate the write head and the read head of each head pair and said channel shield and said channel spacers so as to isolate the write heads and the read heads of the two mutually adjacent head pairs;

forming a head surface by grinding an upper surface of said core-shield-spacer assembly until the legs of said reference core block and the legs of said first and second core blocks become independent and said center shield, said center spacers, said channel shield and said channel spacers become exposed; and

grinding said core-shield-spacer assembly to form an approximately semi-cylindrical tape guide portion at each end of said head surface along the tape transporting direction.

4,696,100

METHOD OF MANUFACTURING A CHIP COIL

Hiromasa Yamamoto, Toyonaka; Sankichi Shida, Nara, and Tsunehiko Todoroki, Kusatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

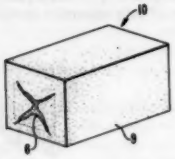
Division of Ser. No. 704,136, Feb. 21, 1985, abandoned, which is a continuation of Ser. No. 418,173, Sep. 14, 1982, abandoned. This application Jun. 30, 1986, Ser. No. 882,567
Int. Cl.[4] H01F *41/00*
U.S. Cl. 29—605 **5 Claims**

1. A method of manufacturing a chip coil comprising the steps of:

winding a conductor wire coated with a heat-resistive insulating film around a magnetic core, and connecting first and second internal terminal electrodes to respective opposite ends of the conductor wire, thereby to produce a coil element;

surrounding the coil element with a protective coating of magnetic substance powder;

after said step of surrounding, firing the coil element and coating of magnetic substance powder to obtain a single sintered mass of magnetic substance completely embedding therein the coil element without any gaps between the coil element and the single sintered mass so as to cover the conductor wire with the mass of magnetic substance in intimate contact with the entire outer surface of the conductor wire;



exposing at least part of each of the first and second internal terminal electrodes; and

connecting first and second external terminal electrodes respectively with the first and second internal terminal electrodes at the exposed part thereof, thereby obtaining the chip coil.

4,696,101

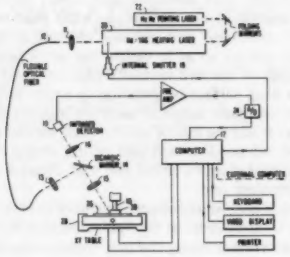
METHOD AND APPARATUS FOR PLACING AND ELECTRICALLY CONNECTING COMPONENTS ON A PRINTED CIRCUIT BOARD

Riccardo Vanzetti, Brockton, and Ashod S. Dostoomian, Stoughton, both of Mass., assignors to Vanzetti Systems, Inc., Stoughton, Mass.

Continuation of Ser. No. 742,178, Jun. 7, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 908,920

Int. Cl.[4] B23P *19/00*

U.S. Cl. 29—740 **5 Claims**



1. An apparatus for placing, soldering and inspecting components and soldered connections on a printed circuit board, comprising: support means for moveably supporting a printed circuit board; supply means for sequentially supplying electronic components, a single mechanical means for automatically selecting, transferring and temporarily holding each electronic component at a predetermined location on said printed circuit board, in a predetermined sequence, wherein said single mechanical means is comprised of a pick and place head which continuously engages each component through said sequence board; laser means for injecting thermal energy into solder material disposed at desired contact points between one of said electronic components and said circuit board to liquify the solder material to form a plurality of solder joints, while each component is held by said mechanical means; infrared radiation sensing means for continuously sensing infrared radiation emitted from each solder joint during heating of each solder joint for providing a signal indicative of liquifaction of said solder material; control means receiving said signal indicative of liquifaction of said solder material for terminating the injecting of thermal energy by said laser means upon liquification of said solder material; and inspection means for comparing the signal provided by said infrared sensing means with a standard signal to determine acceptability of each solder joint.

4,696,102

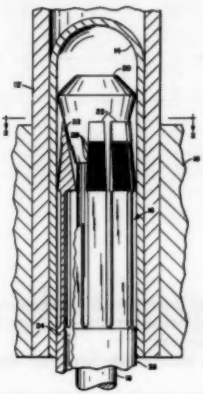
COLLET TYPE GRIPPER

Mark A. Overbay, East Ridge, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jan. 6, 1986, Ser. No. 816,609

Int. Cl.[4] B23P *15/26, 19/04*

U.S. Cl. 29—726 **2 Claims**



1. In combination, a member having an inner wall forming a cylindrical opening, gripping means for tightly gripping the inner wall of the member, said gripping means including a shaft having an enlarged first end extending into the cylindrical opening, and a second end located outside of the member, a hollow member surrounding the shaft, the hollow member having a plurality of flexible metal fingers extending therefrom towards the enlarged first end of the shaft, the end portion of each finger being tapered at given first and second angles on its inner and outer surfaces, respectively; and the enlarged first end of the shaft being frustoconical and forming a third given angle, the first and second angles being such that together they equal the third angle, so that when the enlarged first end of the shaft is moved axially outwardly of the cylindrical opening, the fingers are moved radially outwardly thereby, and the outer surface of the end portions lie parallel to the inner wall of the cylindrical opening and thus, each finger end portion engages the inner wall over a large surface area.

4,696,103

METHOD OF MAKING A ROTATING DISK ELECTRODE

Wishvender K. Behl, Ocean, N.J., and Der-Tau Chin, Winthrop, N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 4, 1986, Ser. No. 937,804

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—825 **4 Claims**

1. Method of making a rotating disk electrode of a soft alkali metal reactive to oxygen and moisture in the air from a stain-

less steel core, a tubular Teflon sheath, a circular disk electrode of said soft alkali metal, a self-tapping stainless steel screw to secure said soft alkali electrode, and a steel spring to provide electric contact to said soft alkali metal electrode, said method including steps of:

(A) machining the top end of the stainless steel core to fit into the shaft of a high-speed rotator,

(B) pressure fitting the bottom end of the stainless steel core containing the self-tapping screw into the Teflon sheath,

(C) bringing the unit into a dry box having a dry and inert argon atmosphere,

(D) placing a short section of coiled steel spring into the opening of the Teflon sheath,

(E) inserting into the Teflon sheath a rod of the soft alkali metal with its diameter slightly smaller than the inside diameter of the Teflon sheath and its length slightly longer than the depth of the opening so that rotation of the rod of

the soft alkali metal forces the self-tapping screw to thread into the rod of the soft alkali metal until the steel spring is sufficiently compressed against the stainless steel core,

(F) measuring the ohmic resistance between the stainless steel core and the inserted rod of the soft alkali metal with a multimeter to ensure that a good electric contact is provided to the rotating disk electrode of the soft alkali metal,

(G) placing the bottom end of the Teflon sheath containing a small amount of excess soft alkali metal into the cavity of an aluminum electrode holder and pressing the entire unit axially until the soft alkali metal expands to completely fill the opening of the Teflon sheath, and

(H) removing the rotating disk assembly from the electrode holder, and removing the excess soft alkali metal on the bottom end of the Teflon sheath by polishing on a carborundum paper.

4,696,104

METHOD AND APPARATUS FOR PLACING AND ELECTRICALLY CONNECTING COMPONENTS ON A PRINTED CIRCUIT BOARD

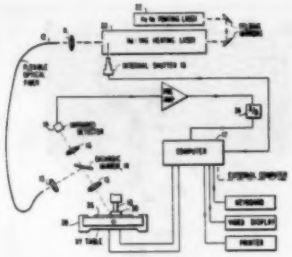
Riccardo Vanzetti, Brockton, and Ashod S. Dostoomian, Stoughton, both of Mass., assignors to Vanzetti Systems, Inc., Stoughton, Mass.

Division of Ser. No. 742,178, Jun. 7, 1985, abandoned. This application Aug. 12, 1986, Ser. No. 895,633

Int. Cl.[4] H05K *3/34*

U.S. Cl. 29—840 **2 Claims**

1. A method for placing, soldering and inspecting components and soldered connections on a printed circuit board at a single work station, comprising the step of: automatically transferring electronic components from supply means to a printed circuit board by using mechanical transfer means; providing each component to be soldered with at least one point having solder material contact holding each component to be soldered in position on said circuit lowed by said mechanical transfer means; injecting thermal energy into said solder material by using laser means, while each electronic component is held in position on said circuit board by said mechanical transfer means, thereby liquifying the solder material at each contact point; detecting infrared radiation emitted from the



solder material injected with thermal energy by using infrared detector means, thereby determining the instant said solder material has been melted at each contact point, thereby providing a signal for turning off the laser means turning off said laser means turning off said laser means when said solder material has melted; and comparing the signal provided by the infrared detector means with a standard ideal signal stored in a memory, thereby determining if a fault is present in the solder joint.

4,696,105

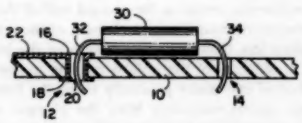
MOUNTING METHOD FOR ELECTRICAL COMPONENTS HAVING CONNECTIONS BOTH ON AND OFF A CIRCUIT BOARD

Edward F. Breya, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 30, 1986, Ser. No. 925,849

Int. Cl.[4] H05K *3/34*

U.S. Cl. 29—840 **1 Claim**



1. A method for mounting an electrical component having at least one connection to be made to a circuit board and at least one connection to be made to a terminal off the circuit board, comprising the steps of:

machine inserting the components such that a first lead passes through a first opening in the circuit board and a second lead passes through a second opening in the circuit board, wherein only the first opening has metallic material adjacent thereto;

flow soldering the circuit board such that the first lead is bonded to the metallic material adjacent the first opening while the second lead remains unbonded;

raising the unbonded second lead from the second opening and connecting said second lead to said terminal; and

soldering said second lead to said terminal.

4,696,106

SINGLE USE DISPOSABLE MEDICAL RAZOR

Robert J. Cross, Haverhill, and William A. Barabino, 19 Sunset Ave., N. Reading, Mass. 01864, assignors to William A. Barabino, N. Reading, Mass.

Filed Jun. 23, 1986, Ser. No. 877,332
Int. Cl.[4] B26B *21/44*
U.S. Cl. 30—41 6 Claims

1. A single use disposable medical razor comprising

an elongated handle means within which is longitudinally disposed a hollow portion defining a reservoir having inner surfaces extending from a proximate end to a distal end therof,

closure means for the reservoir at the proximate end of the reservoir,

a dispensing orifice at the distal end of the reservoir,

plunger means transversely disposed to the hollow portion of the reservoir and essentially filling generally a first half of the reservoir generally adjacent the proximate end thereof and adapted to move along throughout a length of the second half of the reservoir from about a midportion of the hollow portion to a distal end thereof, the reservoir adapted for storing shaving cream in the second half thereof, the plunger having a projecting face for contacting the shaving cream in the second half of the reservoir,

a race means disposed along an element of the reservoir and extending less than the entire length of the handle from about a midpoint of the hollow portion to the proximate end thereof essentially generally along the first half,

protrusion means extending from the plunger means outwardly through the race means for grasping manually by a user and whereby displacement of the plunger means is by grasping the protrusion means and moving it along the race means and by moving the plunger means into the second half of the reservoir for causing the shaving cream to be dispensed from the dispensing orifice in the distal end,

adhesive tape means closing off the dispensing orificce,

an inclined land molded on one of the inner surfaces of the reservoir at the midportion of the reservoir for locking the plunger against reverse movement after the projecting face overrides the inclined land, thus preventing removal of the plunger from the reservoirs and

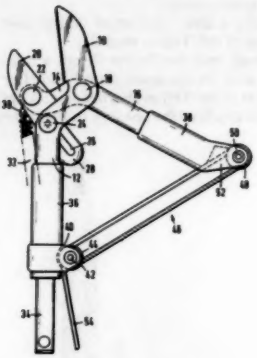
a second inclined land molded on said one inner surface of the reservoir at the furthest point of travel of the projecting face adjacent the dispensing orifice for locking the plunger against reverse movement after the projecting face overrides the second inclined land, thus preventing refilling of the reservoir through the orifice.

4,696,107

PRUNING SHEARS

Peter Held, Betzdorf/Sieg, Fed. Rep. of Germany, assignor to Wolf-Gerate GmbH, Fed. Rep. of Germany

Filed Sep. 9, 1985, Ser. No. 774,069
Claims priority, application Fed. Rep. of Germany, Sep. 7, 1984, 8426495[U]
Int. Cl.[4] B26B *13/00*
U.S. Cl. 30—246 8 Claims



1. Pruning shears comprising a pair of levers and a pivot connection between the levers intermediate the lengths of the levers by which the levers are pivotally connected together;

each lever having a first portion extending on one side of the pivot connection and the first portions cooperating to form together a cutting tool adapted for pruning;

each lever having a second portion extending on the other side of the pivot connection forming a pair of handles operable toward and away from each other;

a spring disposed between the shears levers for driving the first portions of the levers apart;

a force multiplying rope-and-pulley connection between the second portions of the levers comprising a pulley on each lever second portion and a rope wrapped around the pulleys; an end of the rope extending to facilitate manual grasping thereof;

a coupling member connected to one of the lever second portions, the coupling member having means to removably secure and position an extension of the one lever forming a manual support for the pruning shears;

a holding plate pivoted to the one lever at the first portion thereof; and which comprises an anvil, the anvil being attached on the holding plate to pivot therewith; the lever opening spring having one end anchored to the holding plate, a pin on the second portion of the one lever arm, the other end of the spring being anchored to the pin on the second portion of the one lever arm.

4,696,108

PRUNING APPARATUS

Gerhard Zerrer, Korb, and Günter Mayer, Untereisesheim, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,512
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3421999
Int. Cl.[4] B26B *7/00*
U.S. Cl. 30—276 4 Claims

1. Portable pruning apparatus for cutting shoots from vines in a vineyard, the apparatus comprising:

a carrier adapted for mounting on the back of an operator;

drive motor means mounted on said carrier;

a handle for holding the apparatus when cutting vegetation

therewith, said handle having a first end portion facing toward said drive motor means and a second end portion facing away from said drive motor means;

a wand-like guide tube mounted to said handle unit at said second end portion thereof and having an outer end facing away from said second end portion;

a connecting tube connected between said drive motor means and said first end portion;

said guide tube and said handle conjointly defining a rigid unit freely rotatable about an axis through said guide tube with respect to said connecting tube;

elongated and flexible torque transmitting means disposed in said guide tube and said connecting tube for transmitting torque from said drive motor means to said outer end of said guide tube;

an outer shaft rotatably journalled in said outer end of said guide tube and connected to said torque transmitting means for rotation therewith;

knife means mounted on said output shaft so as to permit rotation of said output shaft relative to said knife means;

a slip coupling interposed between said output shaft and said knife means for transmitting rotational torque to said knife means up to a predetermined limit torque thereby restricting the cutting action of said knife means to the removal of

said shoots and protecting the vine against damage by said knife means;

a circular cover having a peripheral edge and a first diameter, said cover being interposed between said outer end and said knife means;

said knife means having an outermost tip defining an outermost cutting circle of a second diameter;

said second diameter being greater than said first diameter thereby defining a cutting ring directly adjacent said peripheral edge; and,

said cover being a single cover and being fixedly attached to said output end so as to cause said peripheral edge adjacent said cutting ring to be clearly visible by the operator thereby facilitating the placement of said peripheral edge at the shoot to be cut from the vine;

said drive motor means being an internal combustion engine; and,

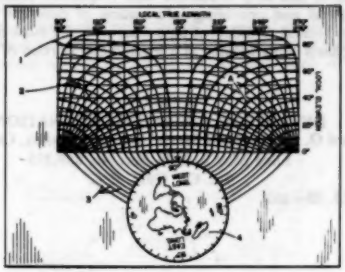
a safety arrangement for starting said engine, said starting arrangement including a starter mounted on said carrier; a starter cord extending from said starter; and, mounting means for guiding said starter cord so as to permit the latter to be pulled only by the operator with the left hand and only in the downward direction while the carrier is mounted on the back of the operator.

4,696,109

SATELLITE LOCATOR

John H. Whaley, Jr., 1019 E. 36th Pl., Tulsa, Okla. 74105

Filed Oct. 3, 1985, Ser. No. 783,459
Int. Cl.[4] G01C *21/02*
U.S. Cl. 33—1 B **1 Claim**



1. An apparatus for determining the azimuth and elevation angles from a known location on the surface of the earth to points in geostationary earth orbit comprising:

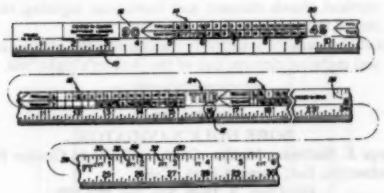
a sheet of suitable material imprinted with a mercator projection grid of true azimuth versus elevation lines with superimposed curves corresponding to geostationary orbital points as calculated from various earth latitudes and superimposed curves corresponding to equal orbital longitude points with an attached rotatable circular dial with markings representing earth longitudes which is appropriately placed to cooincide with the equal orbital longitude curves which extend from said mercator projection grid to the periphery of said circular dial.

4,696,110

PIPEFITTERS TAPE MEASURE

Don W. Walker, and Lynn Rush, both of Santa Fe, Tex., assignors to Billy J. Hawkins, Sr., Frienswood, Tex., a part interest

Filed Jun. 6, 1986, Ser. No. 871,889
Int. Cl.[4] G01B *3/10*
U.S. Cl. 33—137 R **1 Claim**



1. A pipe fitter's measuring tape strip having a front surface marked adjacent one edge with first measuring indicia along the entire length of the strip, and along an opposite edge adjacent a leading first end portion of the strip with separate end to end take-off charts extending lengthwise of the strip providing information respectively for different pipe fittings, said opposite edge of said front surface being marked with further measuring indicia along a second portion of the length of the strip following the first end portion having said charts thereon, said strip measuring a number of feet in length, said first measuring indicia including cumulative inch markings along the length of the strip with selected inch markings repeated at 16" spaces

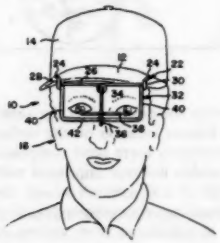
being distinctively marked, said further indicia including cumulative footage markings at the respective footage intervals, and inch markings from one to eleven between each footage marking, said further indicia markings also including total footage marks between selected inch marks, each of said take-off charts comprising an identifying mark at one end thereof, a lengthwise column of pipe size marks, and an adjacent registering column of corresponding take-off marks, the opposite surface of said strip is marked with respective charts located end-to-end and providing information of different size pipe flanges related to different pipe sizes with the most frequently used charts being located at a leading end portion of the strip.

4,696,111

DEVICE FOR ASSESSING INCLINATION

Richard O. Gardner, 419 Marin Ave., Mill Valley, Calif. 94941

Filed May 5, 1986, Ser. No. 859,375
Int. Cl.[4] G01C *9/12*
U.S. Cl. 33—262 **7 Claims**



1. A viewing device which can be optionally used by a golfer or the like for assessing transverse inclination of terrain, comprising

base means for attachment to a cap, hat or headpiece worn by the golfer or other wearer,

a vertical plumb element supported on the base means in front of the wearer for pivotal movement about an axis parallel to the wearer's sight line of the terrain,

a horizontal sighting element afffixed to the vertical plumb element perpendicular both to the plumb element and its pivotal axis whereby the wearer may view selected terrain relative to the horizontal sighting element and rapidly assess transverse inclination of the terrain,

hinge means interconnecting the base means and vertical plumb element for permitting selective movement of the vertical plumb element and horizontal sighting element out of the wearer's sight line, and

retainer means for selectively maintaining the plumb element and sighting element out of the wearer's sight line.

4,696,112

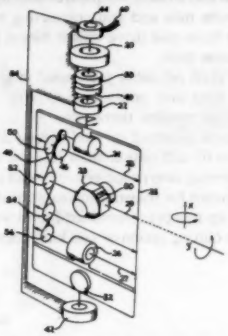
BORE HOLE NAVIGATOR

George J. Hoffman, Malibu, Calif., assignor to Condor Pacific Industries, Inc., Canoga Park, Calif.

Filed Sep. 5, 1986, Ser. No. 903,608
Int. Cl.[4] G01C *19/16*; E21B *47/022*
U.S. Cl. 33—304 **6 Claims**

1. A bore hole navigator comprising

a two axis platform for lowering down a bore hole on a cable with its longitudinal axis parallel to the local bore hole direction, said two axis platform having an outer gimbal, bearing supported on the outer gimbal axis for rotation about the longitudinal axis of said platform, and an inner gimbal axis orthogonal to said outer gimbal axis, said inner gimbal axis having multiple axis segments spaced along the longitudinal axis of said platform and each bearing supported on said outer gimbal, a first said inner gimbal axis segment having a two axis gyro mounted thereon with its spin axis orthogonal to the respective iuner gimbal axis segment, a first gyro sensitive axis parallel to the respective inner gimbal axis segment and a second gyro sensitive axis orthogonal to the spin axis and the first gyro sensitive axis, a second said inner gimbal axis segment having a pitch torquer thereon operative to provide a controllable torque about the respective inner gimbal axis segment, a third said inner gimbal axis segment having a pitch resolver thereon operative to measure rotation of the respective inner gimbal axis segment with respect to said outer gimbal, said first, second and third inner gimbal axis segments being coupled to rotate together, said outer gimbal having a yaw torquer thereon to provide a control-



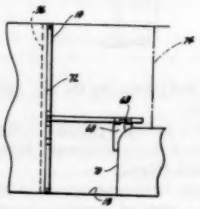
lable torque about the outer gimbal axis, and a yaw resolver thereon to measure rotation of the outer gimbal about the outer gimbal axis, said outer gimbal also having a single axis accelerometer therein having its sensitive axis orthogonal to said outer gimbal axis and said inner gimbal axis segments.

4,696,113

APPARATUS FOR LOCATING THE OUTLINE OF AN ACCESSORY IN DRY WALL OR A DECORATIVE PANEL

George Rice, 120 Stevens Dr., Apt. 104, Ypsilanti, Mich. 48197

Filed Sep. 30, 1985, Ser. No. 781,344
Int. Cl.[4] G01B *5/14*
U.S. Cl. 33—562 **1 Claim**



1. A method for defining the location of an accessory on a wall with respect to a first panel having a vertical edge attached to a vertical wall stud and transferring the location to a second panel to be mounted on the wall adjacent the first panel, comprising the steps of:

tacking a vertical arm to the vertical wall stud along a line defined by the vertical edge of the first panel such that one end of the vertical arm is adjacent either the upper or lower horizontal edge of the first panel;

locating a horizontal arm, connected to the vertical arm, in a position adjacent the accessory;

locating a template, connected to the horizontal arm, such that the template engages the accessory;

locking the horizontal arm to the vertical arm;

locking the template to the horizontal arm;

removing the locked vertical and horizontal arms and template from the vertical wall stud and mounting same on

the second panel such that the vertical arm is mounted along a first edge of the second panel, and said one end of the vertical arm is disposed adjacent a second edge of the second panel so that the template is located in a position on the second panel corresponding to the position of the accessory with respect to the first panel;

forming an outline of the accessory on the second panel;

removing a portion of the second panel defined by said outline to form an opening for receiving the accessory; and

installing the second panel on the wall with the first edge of the second panel attached to the stud such that the opening in the second panel receives the accessory.

4,696,114

METHOD AND APPARATUS FOR THE DRYING OF SOLID MATERIALS BY DISPLACEMENT

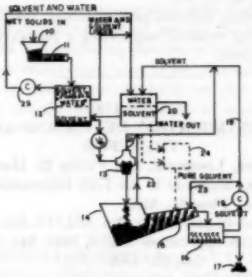
Leonard A. Duval, 207 Harmon Rd., Aurora, Ohio 44202

PCT No. PCT/US84/01617, § 371 Date Jul. 10, 1986, § 102(e) Date Jul. 10, 1986, PCT Pub. No. WO86/02434, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 10, 1984, Ser. No. 890,144

Int. Cl.⁴ F26B *5/16*

U.S. Cl. 34—9 **22 Claims**



1. A method for displacing a first liquid, said first liquid surrounding and wetting finely divided particulate matter, by a second liquid immiscible with said first liquid and having a substantially lower boiling point than said first liquid, said method comprising

heating said wetted finely divided particulate matter to a temperature between the boiling points of said first liquid and of said second liquid; and

admixing said heated wetted finely divided particulate matter with a sufficient quantity of said second liquid to displace said first liquid from said finely divided particulate matter, causing said second liquid to boil in the vicinity of said finely divided particulate matter.

4,696,115

METHOD AND APPARATUS FOR DRYING WET PARTICULATE MATERIAL TO A PREDETERMINED UNIFORM MOISTURE CONTENT

Paul F. Spadafora, Lagrangeville, N.Y., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Jul. 22, 1986, Ser. No. 887,328

Int. Cl.⁴ F26B *3/06*

U.S. Cl. 34—43 **22 Claims**

1. A method for the drying of wet particles in a particle bed in a drying oven, said particles having an average surface temperature rising during a first drying phase, remaining substantially constant during a second drying phase and again rising during a third drying phase, said method comprising the automatically performed steps of:

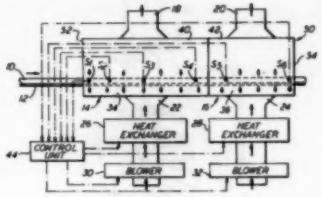
supplying drying air to the oven;

measuring a first average temperature of a group of wet particles in said oven at a first instant during a drying operation;

measuring a second average temperature of said group of wet particles at a second instant subsequent to said first instant during said drying operation, said first and said second instant occurring during the first drying phase;

measuring a third average temperature of said group of wet particles at a third instant subsequent to said second instant, said third instant occurring during said second drying phase;

measuring a fourth average temperature of said group of wet particles at a fourth instant subsequent to said third instant, said fourth instant occurring during said third drying phase;



calculating a difference between said first and said second average temperature;

calculating a difference between said third and said fourth average temperature;

comparing each of the calculated differences with a respective predetermined value; and

modifying a parameter of the drying operation in response to a detected deviation between either of the calculated differences and the respective predetermined value, whereby at a termination of said drying operation the moisture content of a dried product is substantially uniform despite variations in moisture content of the product at a beginning of said drying operation.

4,696,116

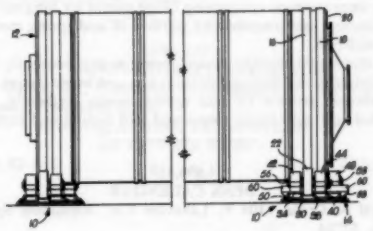
MOUNTING STRUCTURE FOR ROTARY DRUM DRYER

Andrew D. Livingston, Independence, Kans., assignor to Guaranty Performance Co., Inc., Independence, Kans.

Filed Jun. 23, 1986, Ser. No. 877,531

Int. Cl.⁴ F26B *25/02*

U.S. Cl. 34—108 **4 Claims**



1. Mounting structure for use in rotationally supporting an elongated, substantially horizontally oriented, cylindrical body having a vertical plane of symmetry through the rotational axis thereof, said mounting structure comprising:

first and second proximal, juxtaposed, continuous annular tracks fixedly secured to said body, said tracks each presenting an outer engagement face;

first track support means contacting said first track face on a first side of said vertical plane for rotatably supporting

said first track, said first support means being the sole rotational support for said first track; and

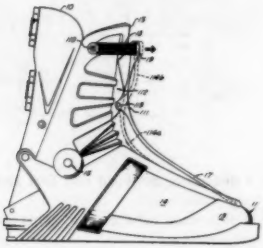
second track support means contacting said second track face on a second opposed side of said vertical plane for rotatably supporting said second track, said second support means being the sole means of rotational support for said second track.

4,696,117

SPRING STRUCTURE FOR SKI BOOT

Marco T. Ottieri, 148 Bridge St., Manchester, Mass. 01944

Filed Oct. 10, 1986, Ser. No. 917,910
Int. Cl.[4] A43B 5/04
U.S. Cl. 36—117 **9 Claims**



1. In a ski boot having a base element providing at least sole, toe, and instep portions,

means forming a leg cuff hingedly secured to said base element for supportingly engaging at least the calf and shin of a wearer,

a forward lean control element coupled between said base element and said cuff, said forward lean control element including elongate resiliently-flexing spring means having an intermediate portion joining first and second end portions,

coupling means on said cuff for coupling said first end portion of said spring means to said cuff, and

coupling means for coupling said second end portion of said spring means to said toe portion

the improvement comprising hinge means for hingedly connecting said intermediate portion of said spring means to said cuff,

so that a first portion of said spring means resiliently flexes between said first end portion and said hinge means, and a second portion of said spring means resiliently flexes between said hinge means and said second end portion.

4,696,118

DESK CALENDAR

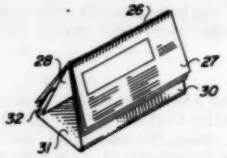
Carroll N. Cross, 1104 E. Lakeview Cir., Altamonte Springs, Fla. 32714

Filed Dec. 2, 1985, Ser. No. 803,147
Int. Cl.[4] G09D 3/04
U.S. Cl. 40—120 **9 Claims**

1. A display mount comprising:

first, second, third and fourth panels, each having a plurality of edges;

the first panel being hinged to the second panel with a flexible hinge between one edge of the first panel and one edge of the second panel and the second panel being hinged to the third panel with a flexible hinge between one edge of the third panel and a second edge of the second panel and the third panel being hinged to the fourth panel with a ductile hinge material between one edge of the fourth panel and a second edge of the third panel, the first and second panels being of substantially the same length and the third panel being of a shorter length then the first and second panels and the fourth panel being of shorter length then the first, second and third panels, whereby the fourth panel can be bent on its bendable hinge relative to the



third panel when the first and second panels are folded to lay on the fourth panel for displaying in one position and the first panel can be supported in an upright position with its edge on the third panel in a second displaying position, and the first and second panels can be folded for reference or writing upon; and

polymer banding material banded around said first panel and said banding material supporting a plurality of sheets to said first panel.

4,696,119

ANIMAL IDENTIFICATION DEVICE AND APPLICATOR THEREFOR

Steven R. Howe, Longmont, and Phillip D. Howe, Berthoud, both of Colo., assignors to An-Tech International Livestock Products, Inc., Phoenix, Ariz.

Continuation-in-part of Ser. No. 402,910, Jul. 29, 1982, abandoned. This application Aug. 8, 1984, Ser. No. 638,983
Int. Cl.[4] G09F 3/00
U.S. Cl. 40—301 **16 Claims**

1. An animal identification tag for use with an attachment device having a stem surmounted by a generally conical member and having means for penetrating an ear or other portion of an animal for attaching said tag to said portion of said animal, comprising:

a body having at least one area on which indicia may be placed;

a socket extending laterally from said body and having a well adjacent the outer end of said socket, said body and socket having a hole communicating with said well and through which said generally conical member of said attachment device may be moved, after penetration of said animal with the side thereof opposite said socket being adapted to abut said portion of said animal; and

a plurality of passageways formed by an undulating configuration of the surface of said side of said tag opposite said socket for permitting a flow of outside air to the area of said animal around said stem of said attaching device with said side of said tag opposite said socket abutting said portion of said animal.

4,696,120

FISHLINE SNAP CONNECTOR

Donald R. Schroeder, Rte. 3, Box 54, Amery, Wis. 54001

Filed Feb. 13, 1987, Ser. No. 14,728
Int. Cl.[4] A01K 91/04
U.S. Cl. 43—44.83 8 Claims

1. A snap connector for connecting lures to fishing lines and the like, said connector including:

a. a wire of predetermined length and of a material to provide a spring force tending to return the wire to a straight condition;

b. a first spring loop formed in said wire to provide a pair of arms;

c. a first of said arms being substantially shorter than the second of said arms and being provided with a formed hook on the ultimate end thereof;

d. the second of said arms providing a second spring loop spaced from said first spring loop with a portion of said second arm extending beyond said second loop; and,

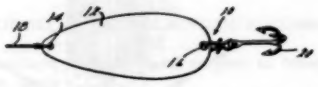
e. said second arm extending portion providing an engagement area to receive said hook of said first arm and further providing a formed second hook on the ultimate end thereof to engage with the length of said second arm intermediate said first and second spring loops.

4,696,121

FISHING LURE BREAKAWAY CLIP

Bradley W. Hernden, 20488 Poinciana, Redford, Mich. 48240

Continuation-in-part of Ser. No. 589,228, Mar. 14, 1984, abandoned. This application Apr. 4, 1986, Ser. No. 848,311
Int. Cl.[4] A01K 91/04
U.S. Cl. 48—17.2 10 Claims



1. A breakaway clip connected between a fishing lure and hook, said fishing lure connected to a fishing line, said clip comprising:

a formed wire member having a substantially straight center section with first and second loop portions extending from opposite ends of said straight center section, said loop portions having a section which is positioned in close proximity to said center section, said loop portions terminating in curled ends which diverge from said center section, whereby said curled ends enable said clip to be attached to said hook and said lure by sliding said hook or lure along said center section and contacting said curled ends, thereby deflecting said loop portions and permitting said hook or lure to be retained by said loop portions, and said clip formed from wire stock of a diameter which is selected to cause said clip to fail at a predetermined repeatable release load level which is substantially less than the failure release load level of said fishing line attached to said lure such that said clip fails by plastic deformation when said predetermined load level is reached, enabling said lure to be retrieved.

4,696,122

FISHING ROD HOLDER/CARRIER

Jad D. Van Der Zyl, 1140 NE. 51st Ave., Des Moines, Iowa 50313

Filed Mar. 9, 1987, Ser. No. 23,573
Int. Cl.[4] A01K 97/10
U.S. Cl. 43—21.2 10 Claims

1. Apparatus for holding fishing poles comprising:

a first shaft having a first longitudinal axis;

a second shaft having a second longitudinal axis disposed substantially parallel to said first longitudinal axis;

first clip means attached to one end thereof to said first shaft and at the other end thereof to said second shaft for holding a lower portion of a fishing rod;

second clip means attached at one end thereof to said first shaft and at the other end thereof to said second shaft for holding an upper portion of a fishing rod, said second clip means being spaced from said first clip means;

first support means attached to one end of said first and second shafts;

second support means attached to the other end of said first and second shafts;

a first pair of substantially parallel legs operatively attached, one to each end of said first support means, said first pair of substantially parallel legs being transversely disposed with respect to said first and second longitudinal axes of said first and second shafts; and

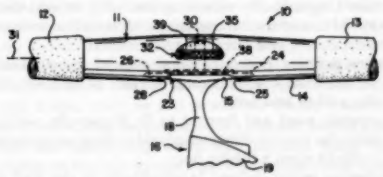
a second pair of substantially parallel legs operatively attached, one to each end of said second support means, said second pair of legs being generally transversely disposed with respect to said first and second longitudinal axes of said first and second shafts.

4,696,123

REEL MOUNT FOR A FISHING ROD

Joe B. Bailey, Jr., Lexington, S.C., assignor to Shakespeare Company, Columbia, S.C.

Filed Aug. 27, 1982, Ser. No. 412,203
Int. Cl.[4] A01K 87/06
U.S. Cl. 43—22 8 Claims



1. In the handle of the fishing rod, a reel mount comprising:

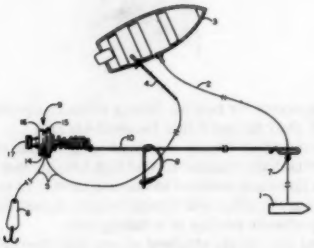
a gripping portion, said gripping portion having a smoothly contoured exterior gripping surface and a hollow interior cavity into which the foot of a reel may be received; an aperture penetrating said gripping surface, the dimensions of said aperture permitting the foot of the reel to be button holed therethrough; a fixed seating surface within said cavity at the longitudinal extremities of said aperture; a pressure plate received within said cavity in opposition to said aperture; and, adjusting means to translate said pressure plate and thereby releasably to clamp the reel foot between said pressure plate and said seating surface.

4,696,124

DOWNRIGGER FISHING LINE RELEASE APPARATUS

Mark E. Wille, 133 Seager Dr., Oconomowoc, Wis. 53066

Filed Jul. 14, 1986, Ser. No. 885,175
Int. Cl.[4] A01K *93/00*
U.S. Cl. 43—43.12 **1 Claim**



1. Downrigger fishing line release apparatus comprising a primary fishing line loop release apparatus wherein the improvement comprises:

(a) secondary fishing line release apparatus consisting of primary fishing line release wire and

(b) secondary line release eye

(c) freely slidable on said primary fishing line release wire, and

(d) secondary line release loop on one leg of said line release eye, and

(e) secondary line release leg of said line release eye extending through said secondary line release loop, and

(f) secondary line release loop to flex beyond the end of secondary line release leg when force is applied outward by fishing line at site of line release loop.

4,696,125

CASTING FLOAT WITH LINE STOP

Walter Rayburn, P.O. Box 892, Loveland, Colo. 80539-0892

Filed Jun. 18, 1982, Ser. No. 390,130
Int. Cl.[4] A01K *93/00*
U.S. Cl. 43—43.14 **3 Claims**

1. A fishing float that comprises:

a hollow shell that has openings at respective opposite ends thereof;

a slit formed longitudinally in the wall of said shell;

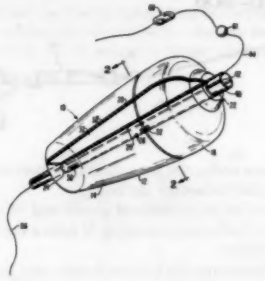
a tube longitudinally extending internally of said shell and joined to said shell at opposing ends to define an open path from one of said openings to the other;

means defining generally-radial parallel-spaced walls that extend from corresponding margins of said slit through the wall of said tube;

a conduit sized and formed to fit frictionally within said tube, the interior diameter of said conduit accommodating a slip-fit upon a fishing line;

accepting means defined longitudinally in the wall of said conduit for admitting said line from said slit into the interior of said conduit, permitting captivation of said line within said conduit upon misalignment of said accepting means relative to said slit;

an aperture defined in the wall of said tube intermediate said openings, said aperture serving as a vent to allow water to flow into or out of the interior of said shell but said aperture being closed by said conduit upon fitting of the latter in place within said tube.

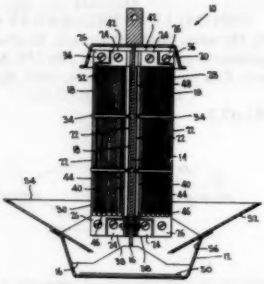


4,696,126

METHOD OF TRAPPING FLYING INSECTS

Roger H. Grothaus, and Donald W. Hildebrandt, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 607,371, May 7, 1984. This application May 1, 1986, Ser. No. 858,416
Int. Cl.[4] A01M *1/22*
U.S. Cl. 43—112 **4 Claims**



1. A method for trapping flies and flying insects of comparable size, comprising:

making available to the flying insects a trap which comprises an array of substantially parallel exposed conductors, means below the array for receiving and holding insects, means adjacent the array for directing downwardly flying insects into contact with the receiving-and-holding means, and means for periodically generating opposing pulsating charges and delivering such charges to adjacent pairs of the conductors;

applying no charge to the adjacent pairs of conductors so as to allow flying insects that are attracted to the trap to alight on adjacent pairs of the conductors; and

operating the pulsating-charge means so as to deliver to the exposed conductors charges having about 25 to 40 volts peak and a frequency of about 60 to 600 Hz, thereby causing the flies that have alighted on adjacent pairs of the conductors to be subjected to a less-than-lethal shock which causes the conductor-alighted flies to fly in a gener-

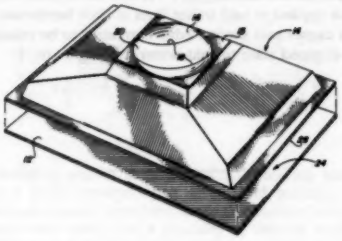
ally downward direction into the insect receiving-and-holding means via the flying insect-directing means.

4,696,127

CONTAINER FOR CAPTURING INSECTS

Nathan F. Dobbs, P.O. Box 1075, Ormond Beach, Fla. 32074

Filed Dec. 22, 1986, Ser. No. 944,185
Int. Cl.[4] A01M *1/14*
U.S. Cl. 43—121 **10 Claims**



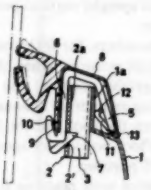
1. A sealable container for capturing insects comprising:
(a) a base member having:
(i) an upper side;
(ii) a lower side; and
(iii) a peripheral edge which borders said upper and lower sides;
(b) a top portion attachable to said base member, wherein said top portion defines a hollow cavity and comprises:
(i) a lower edge which is attachable to the upper side of said base member along the peripheral edge; and
(ii) ingress means openable and closeable for allowing insects to enter the hollow cavity when opened and for preventing insects from exiting the hollow cavity when closed;
(c) attachment means for securing the lower edge of said top portion to the upper side of said base member along the peripheral edge thereof; and
(d) adhesive means placed at least on the upper side of said base member for trapping insects within the hollow cavity when said top portion is attached to said base member.

4,696,128

DEVICE FOR SECURING MOLDING OF AUTOMOBILE DOOR

Kunihiro Fukuhara, Toyota, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Jan. 29, 1986, Ser. No. 823,680
Claims priority, application Japan, Feb. 5, 1985, 60-14223[U]
Int. Cl.[4] E06B *7/16*
U.S. Cl. 49—492 **4 Claims**



1. A clip for securing molding of an automobile door to a marginal portion of the door presenting opposite surfaces facing outwardly and inwardly with respect to the interior of the automobile, said clip being of substantially channel-shaped downwardly open sectional profile and including outer and inner legs connected by a web, said inner and outer legs having free ends distal the web for embracing said marginal portion and overlapping said outwardly and inwardly facing surfaces, said inner leg integral with a resilient lock pawl extending inwardly from said inner leg for engaging a complementary edge on said inner surface for securing said inner leg with respect to said marginal portion, the outer leg having an inner projection projecting obliquely inwardly from the free end of the inner surface of the outer leg toward said web and terminating in a free end, and the inner projection having a further portion extending from the free end of the inner projection outwardly toward and adjacent to the inner surface of the outer leg and being located for engaging between and contacting both said outer leg and said outwardly facing surface of the door marginal portion for preventing detachment of the clip from the door marginal portion when the clip is fully assembled with the door marginal portion.

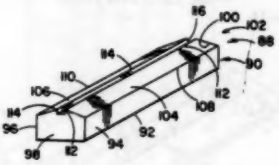
2. The clip in claim 1 in combination with the marginal portion of an automobile door and a window molding having a substantially channel-shaped sectional profile open downward, said molding further having a hook shaped portion provided along its outer lower surface engaging the free end of the outer leg of the clip, and a pawl shaped portion provided along its inner lower surface engaging with a folded hook located along the free end of the inner leg of the clip.

4,696,129

HONING DEVICE

Timothy A. Roberts, 824 Linlawn Dr., Wabash, Ind. 46992

Continuation of Ser. No. 613,896, May 24, 1984, abandoned.
This application May 27, 1986, Ser. No. 867,614
Int. Cl.[4] B24D *15/06*
U.S. Cl. 51—214 **7 Claims**



1. A honing device for simultaneously engaging a plurality of discrete broadhead blades equally spaced circumferentially about and radiating outwardly from a common ferrule and the cutting edge of each blade tapering relative to a longitudinal axis of the the common ferrule, the device comprising:
a base;
an upper portion integral with said base and including two spaced-apart planar honing surfaces, each having an adjacent edge, and disposed relative to one another so that each of said spaced-apart honing surfaces engages one of said discrete broadhead blades along substantially the entire length of its cutting edge so as to abrade the engaged cutting edge of said blades in a direction that is not parallel to the cutting edge upon the longitudinal movement of the common ferrule; and
means, disposed between said adjacent edges of said honing surfaces, for accommodating the unobstructed travel of the ferrule as said spaced-apart honing surfaces engage said discrete broadhead blades to hone said engaged blade surfaces upon relative longitudinal movement between said honing surfaces and broadhead blades wherein said accommodating means includes a channel having a pair of opposite upstanding walls, said channel being dimensioned so that the ferrule does not contact either upstanding wall upon relative longitudinal movement between said honing surfaces and broadhead blades.

4,696,130

METHOD OF PROFILING AND DRESSING GRINDING WHEELS

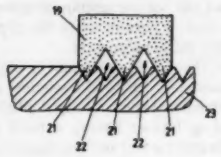
Heinz Belthle, Aichwald, Fed. Rep. of Germany, assignor to Schaudt Maschinenbau GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 28, 1986, Ser. No. 901,774

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3531044

Int. Cl.[4] B24D *18/00*

U.S. Cl. 51—293 **2 Claims**



1. A method of profiling and dressing a grinding wheel, for the grinding of external threads with a diamond roll having a profiling rib, comprising the steps of using the rib of the roll to provide the periphery of the wheel with a first groove, withdrawing the rib from the first groove, moving the roll in parallelism with the axis of the wheel, and using the rib to provide the periphery of the wheel with a second groove.

4,696,131

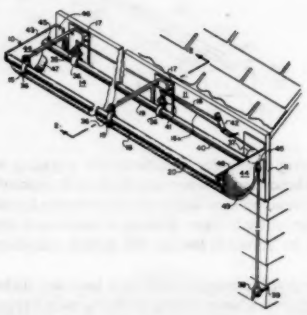
EAVES RAIN GUTTER

Robert Z. Schreffler, 12817 Richmond St., Chester, Va. 23831

Filed Oct. 3, 1986, Ser. No. 914,919

Int. Cl.[4] E04D *13/00*

U.S. Cl. 52—11 **6 Claims**



1. An eaves rain gutter for mounting upon fascia of a building comprising:

(a) an elongated flexible trough having first and second parallel stiffened edge extremities, the first edge extremity being held in fixed horizontal position, and the second edge extremity being movably held in a horizontally disposed water-holding state at an elevation adjacent said first edge extremity and causing said trough to have a sling-like configuration, said second edge extremity being capable of falling freely by gravity to a dumped state wherein the trough is disposed as a vertically oriented substantially flat sheet pendantly supported by aid first edge extremity,

(b) a plurality of supporting brackets attachable to said fascia and configured to hold said first edge extremity in a fixed horizontal position, and hold said second edge extremity in a releasible horizontal position,

(c) a plurality of tether lines interactive with said second edge extremity at horizontally spaced sites thereof and adapted to raise said second edge extremity from its position in the dumped state to its position in the water-holding state,

(d) anchoring means for maintaining said tether lines in a fixed position in the water-holding state of the rain gutter, and

(e) guide means which slidably engage said tether lines in a manner causing an angular directional change of the tether lines permitting movement of said tether lines in horizontal and substantially vertical directions, whereby

(f) force applied to said tether lines in their horizontal directions causes said second edge extremity to be raised from said dumped state to said water-holding state.

4,696,132

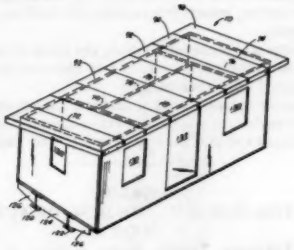
FOLDABLE SHELTER SYSTEM AND METHOD OF CONSTRUCTION

J. T. LeBlanc, P.O. Box 17501, Baton Rouge, La. 70893

Continuation of Ser. No. 725,626, Apr. 22, 1985, abandoned. This application Sep. 15, 1986, Ser. No. 907,573

Int. Cl.[4] E04B *1/344*

U.S. Cl. 52—69 **3 Claims**



1. A foldable shelter, comprising:

a. a substantially rectangular floor portion;

b. a plurality of wall portions hingedly attached to said floor portion movable between horizontal positions along said floor portion to upright vertical positions for supporting a roof thereupon;

c. corner post members for interconnecting the adjoining edges of the wall portions when the wall portions are in the vertical upright position, the corner post members further including an internal channel for housing electrical conduit between the roof and the floor portion;

d. means on said floor portion for accommodating a plurality of interior wall portions;

e. means on exterior wall portions for interconnecting said exterior wall portions to said interior wall portions; and

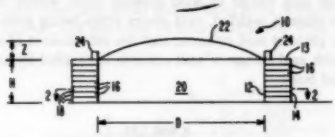
f. roof means, including a plurality of panels interconnectable so that a pair of vertically disposed lip members interlock in a first position with a substantially horizontally disposed lower member positioned within a mating position in a horizontal groove, and further providing means positioned between the members to form a fluid tight seal therebetween.

4,696,133

BUILDING WITH COVERED INTERIOR OPEN SPACE

Michael Wren, Rushville; Paul W. Lantz, Columbus; George W. Acock, Jr., Columbus, and James A. Rhodes, Columbus, all of Ohio, assignors to James A. Rhodes & Associates, Columbus, Ohio

Continuation-in-part of Ser. No. 541,212, Oct. 12, 1983, abandoned. This application Jan. 27, 1986, Ser. No. 822,491
Int. Cl.[4] F04B *1/342*
U.S. Cl. 52—80 12 Claims



1. A building system having enclosed building units surrounding a dome-covered open space, said building system comprising an annular structure having an annular inner wall, an annular outer wall, and a plurality of interior walls, said walls defining said building units, with an open space located within said inner wall; a dome roof covering the open space; said inner wall having a surface area Aw and a thickness Lw and being formed of a material having a coefficient of thermal conductivity Kw and said roof having a surface area Ar and a thickness Lr and being formed of a material having a coefficient of thermal conductivity Kr such that KwAw/Lw=-KrAr/Lr, thereby providing improved climate control, including minimizing heat loss or gain, and so minimizing power requirements for atmospheric control within the building and open space.

4,696,134

DEVICE FOR MARKING OUT LAND

Robert Neaume, Bourpeuil-le Vigeant, 86150 l'Isle Jourdain, France

Filed Jul. 1, 1986, Ser. No. 881,056
Claims priority, application France, Jul. 9, 1985, 85 10500
Int. Cl.[4] E01F *9/02*
U.S. Cl. 52—103 5 Claims

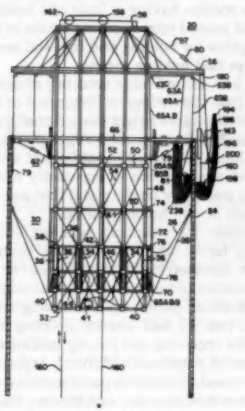
1. A device for marking out land, in particular agricultural land, said device comprising a stake of flexible plastics material including a stem which has a point at a lower end thereof and which is extended at an upper end thereof by a marker head formed integrally with said stem, said stem having an upper region integral with said marker head and a lower region including said point and adapted to be driven into the ground, said upper region being less rigid than said lower region, said lower region of said stem having a cross-shaped section defined by a first arm extending longitudinally of said stem up to said marker head with a gradually increasing width in the direction of said marker head, and a second arm which crosses said first arm in section and which tapers out at least in the vicinity of said marker head.

4,696,135

METHOD AND APPARATUS FOR CONSTRUCTING TOWERS

Franz Kallinger, Greenwich, Conn., and Mark E. Killion, Paris, Ill., assignors to Custodis-Cottrell, Inc., Branchburg, N.J.

Filed Mar. 25, 1986, Ser. No. 843,720
Int. Cl.[4] B06C *23/62*
U.S. Cl. 52—121 20 Claims



1. A derrick for use in the construction of a tower, which derrick may be suspended from the tower by cable means, the derrick having:

an upper part and a lower part, one of which may be vertically extended relative to the other to vary the vertical dimension of the derrick;

pulley means for automatically maintaining an item which is suspended from the derrick at a constant elevation when the derrick is extended, and for raising the item when the derrick is retracted,

said pulley means comprising:

cable means attached to the item;

at least one first pulley suspended from a relatively high point on the upper part of the derrick through which the cable means suspends the item from the derrick and through which the cable means is turned downwards;

a post attached to a bottom of the upper part of the derrick and extending down past the bottom of the upper part and past a top of the lower part of the derrick;

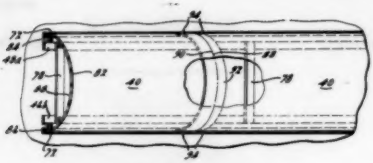
a second pulley on a lower part of the post which turns the cable means form the pulley toward the top of the lower part of the derrick; and

an attachment point at the top of the lower part of the derrick to which the cable means is attached.

4,696,136
SIMULATED PIPE CONSTRUCTION

Ronald E. Grewe, Novi, Mich., assignor to Marketing Displays, Inc., Farmington Hills, Mich.

Filed Aug. 11, 1986, Ser. No. 895,452
Int. Cl.[4] E04B 1/00
U.S. Cl. 52—222 44 Claims



1. A simulated pipe construction for attaching to a building having a plurality of corner defining faces comprising:

first and second pipe sections for attaching to two of said corner defining faces;

each pipe section having a first elongated and flexible panel having first and second edges in the longitudinal dimension and third and fourth edges in the transverse dimension;

each pipe section having at least one holding means having first and second edge securing means in spaced relation to one another for holding said first and second edges of said panels in said holding means;

said first and second edge securing means being closer together than the transverse dimension of said panel, so that said panel assumes an arc shaped configuration when held along said first and second edges by said holding means;

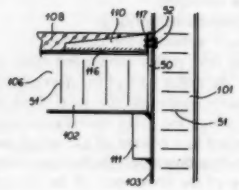
a spring force generated in said panel upon insertion such that said spring force is outwardly exerted against said holding means for holding said first and second longitudinal edges in said holding means;

corner means for attaching between two of said corner defining faces, said corner means having an arc-shaped exterior geometrically conforming to said arc-shaped configuration of said panel such that said corner means has a longitudinal radius for simulating bending of a pipe around two of said corner defining faces and having means for receiving and joining said third edge of said first pipe section panel and said fourth edge of said second pipe section panel so that said panel sections when so joined lie on lines which intersect one another thereby simulating a pipe extending around a corner of said building.

4,696,137
BEAM-COLUMN JUNCTION

Jean-Baptiste Schleich, Kockelscheuer, Luxembourg, assignor to Arbed S.A., Luxembourg, Luxembourg

Filed Jan. 29, 1986, Ser. No. 823,598
Claims priority, application Luxembourg, Feb. 1, 1985, 85753
Int. Cl.[4] E04B 1/00
U.S. Cl. 52—251 8 Claims

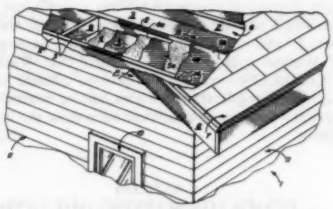


1. In a beam support joint for a column and a beam, in which said column and said beam are each constructed from concrete and at least one metal section having a pair of flanges joined by a web and defining at least one recess, wherein said recess of said metal section is filled with concrete and outer surfaces of said flanges of said metal section are not covered with concrete and are otherwise exposed, the improvement wherein an upper support strap is positioned on an upper flange of said beam, and is attached to said column and said beam to take up tension, and wherein said upper support strap and said webs of both said beam and said column all lie substantially in the same plane and a lower support plate is welded to one of said outer surfaces of one of said flanges of said column for supporting said beam, which has a width, which substantially corresponds to the width of said flange of said column onto which said lower support plate is welded, said upper strap being provided with a cover plate at said column, and the attachment of said cover plate with said flange of said column is enabled by at least one threaded bolt.

4,696,138
INSULATION CONFIGURATIONS AND METHOD OF INCREASING INSULATION EFFICIENCY

Christopher A. Bullock, 3321 Pines Rd., Shreveport, La. 71119

Continuation-in-part of Ser. No. 577,525, Feb. 6, 1984. This application Jan. 4, 1985, Ser. No. 688,876
Int. Cl.[4] E04B 2/00
U.S. Cl. 52—407 15 Claims



1. An insulation configuration for attic floors comprising a layer of non-solid insulation material adjacent said attic floor and at least one moisture vapor-permeable film means positioned horizontally over said insulation material and exposed to the air, whereby air circulation into said insulation material from the attic is reduced.

14. A method for increasing the efficiency of a non-solid insulation layer adjacent the floor of an attic comprising installing at least one sheet of moisture-vapor permeable film horizontally over said insulation layer and exposed to the air in the attic, to reduce air circulation into said insulation.

4,696,139
MODULAR STRUCTURE, STUD THEREFOR, AND METHOD OF CONSTRUCTION

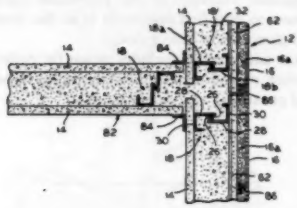
Donald L. Kiselewski, 4705 Holly Dr., Palm Beach Gardens, Fla. 33410

Division of Ser. No. 470,160, Feb. 28, 1983, Pat. No. 4,551,961. This application Sep. 11, 1985, Ser. No. 774,668
The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.
Int. Cl.[4] E04B 2/00
U.S. Cl. 52—426 4 Claims

1. A wall system formed of an inner and outer panel supported by a perforated stud to define a cavity therebetween, comprising:

a first portion of said perforated stud to which said inner panel is adapted to be secured without exposed fasteners and a second portion of said perforated stud to which said outer panel is adapted to be secured without exposed fasteners, said first and second portions of said perforated stud being substantially identical to one another, each of said first and second portions of said perforated stud hav-

ing a mounting flange with a web extending therefrom, said web of said first portion of said perforated stud extending toward said outer panel and said web of said second portion of said perforated stud extending toward said inner panel after said inner and outer panels have been secured to said first and second portions to form said wall, said first and second portions of said perforated stud having respective engagement means at the ends of said webs remote from said mounting flanges and being relatively movable toward and away from one another for assembling said inner and outer panels into the form of said wall after said inner and outer panels have been secured to said first and second portions of said perforated stud, at least



one of said webs of said first and second portions of said perforated stud being perforated inwardly of said inner and outer panels and outwardly of said engagement means within said cavity, said cavity being adapted to receive concrete to force said respective engagement means into firm engagement by applying an outwardly directed force to said inner and outer panels after assembly into the form of a wall, said perforated web accommodating the flow of concrete therethrough to permanently interlock and encase said first and second portions of said perforated stud;

whereby said inner and outer panels of said wall can be permanently maintained in space apart relationship by a preselected distance to form a rigidized modular structure.

4,696,140

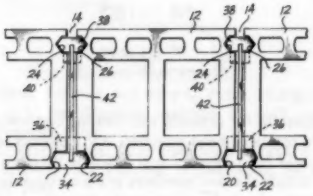
CONNECTOR GUIDE SYSTEM FOR CONSTRUCTION WALLS

Robert H. Marshall, 22811 Orville Rd. East, Orting, Wash. 98360

Continuation-in-part of Ser. No. 455,210, Jan. 3, 1983, abandoned. This application Aug. 9, 1985, Ser. No. 764,431

Int. Cl.[4] E04B *2/20, 1/02;* **E04C** *1/10*

U.S. Cl. 52—442 **7 Claims**



1. A wall construction, comprising:

a plurality of blocks, each having an exterior face and an interior face, and two ends, and two vertical notches formed in each end of the block, one adjacent the exterior face and the other adjacent the interior face;

a plurality of connector guides, one at each end of each block, each connector guide comprising:

a pair of vertically extending guide members, one for each notch, each said guide member having a portion which fits into its notch, and each including a lower end platform leg which projects laterally below a portion of the block adjacent the notch,

tie means interconnecting the two guide members;

said connector guides positioning the blocks to provide a substantially true alignment of the blocks and also spacing the blocks apart both vertically and horizontally by amounts to provide substantially uniform mortar joint spaces between the blocks;

wherein the tie means for each connector guide comprises an upper connector rod member having end portions embedded in the upper ends of the guide members and a lower connector rod member having end portions embedded in the lower ends of the guide member, and

wherein the ends of the rod members are bent to extend longitudinally of the guide members.

4,696,141

SUSPENDED CEILING HAVING A CONCEALED SUSPENSION GRID AND LAY-IN METAL PANELS SUPPORTED THEREON

Martin Nassof, Cliffside Park, N.J., assignor to Simplex Ceiling Corp., Hoboken, N.J.

Filed Jun. 19, 1986, Ser. No. 875,944

Int. Cl.[4] E06B *3/54*

U.S. Cl. 52—484 **4 Claims**

1. A suspended ceiling system for a room, which comprises

a plurality of inverted T-shaped members suspended from the structural ceiling of the room and extending across the room; each said T-shaped member having a horizontal base portion;

a plurality of open metal ceiling panels having opposed first and second side walls, opposed first and second end walls and a bottom wall;

said first side wall of a said panel having a flange projecting therefrom in a direction away from said second side wall, said flange being parallel to and spaced from said bottom wall;

said end walls of a said panel having first and second ends adjacent said first and second side walls, respectively, said end walls having a lower portion integral with said bottom wall and an upper portion spaced from said lower portion at said end wall second end to define an open slot in each said end wall parallel to and spaced from said bottom wall, the opening of each said slot facing said second side wall, said upper portion being set back from said lower portion at each end wall second end;

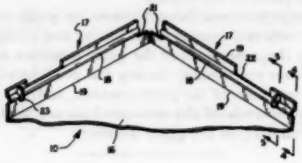
said panels being supported by said inverted T-shaped members with the flange of a said panel resting on and supported by one side of the horizontal base portion of a said T-shaped member while the other side of said horizontal base portion is received in the slots of the end walls of an adjacent abutting panel; and said first side wall of a said panel having a plurality of longitudinally spaced apart detents formed therein and projecting in a direction away from said first side wall and said second side wall having a plurality of open notches therein spaced apart such that the detents of a said panel will be received in the notches of an adjacent abutting panel, and wherein said detents have upper and lower portions relative to said bottom wall, said upper portion being planar and substantially perpendicular to said first side wall; whereby the joints between adjacent panels are aligned.

4,696,142

SUSPENSION CEILING WITH SNAP-UP PANELS

David F. Micyal, Strongsville, and Gerald L. Koski, Parma, both of Ohio, assignors to Donn Incorporated, Westlake, Ohio

Filed Sep. 26, 1986, Ser. No. 911,773
Int. Cl.[4] E04B 5/57
U.S. Cl. 52—762 **9 Claims**



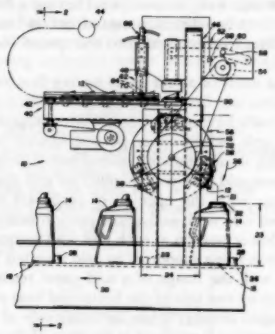
1. A snap-up pan for installation in suspension ceiling grids formed of runners intersecting to provide openings surrounded by lips, comprising sheet metal providing a planar portion and laterally extending flanges surrounding said planar portion, said flanges providing a rib therein extending lengthwise of the associated flange, and detents substantially adjacent to the ends of each flange aligned with said ribs, said detents extending laterally with respect to said flanges in the same direction as said ribs beyond the extremities thereof, the lower side of said detents blending into the lower side of the associated of said ribs, said ribs and detents being operable to snap over adjacent of said lips to support said pans on said adjacent lips in said opening, said detents being operable to provide a supporting connection with said lips which compensates for variations in spacing between said lips adjacent to the corners of said openings.

4,696,143

CONTAINER CAPPING APPARATUS

William P. Young, Southfield, Mich., assignor to William P. Young Co., Farmington, Mich.

Filed May 6, 1986, Ser. No. 860,084
Int. Cl.[4] B67B 5/00, 3/22; B65B 7/28
U.S. Cl. 53—289 **20 Claims**



1. An apparatus for installing caps on containers having an open neck, the opening in the neck having a central axis, comprising:

a first conveyor for sequentially, individually delivering a plurality of containers to and through a predetermined work station position along a direction of conveyance;

a means for individually positioning a cap in registration with a container neck at said predetermined work station position and for depressing the cap against the open neck of the container;

wherein said positioning and depressing means includes a carriage having an axis of rotation and having means for receiving at least one of said caps at a circumferential position of said carriage;

means for rotatably supporting said carriage in a fixed position at said work station position so that its axis of rotation is aligned perpendicular to said direction of conveyance and perpendicular to the central axis of the opening in the neck, and wherein the axis of rotation is spaced along said central axis so that a proximate carriage position closest to said conveyor positions a cap received in said receiving means for seating engagement with the container neck; and

means for rotating said carriage about its axis so that the tangential velocity of the proximate carriage position closest to said first conveyor is in the same direction as said direction of conveyance;

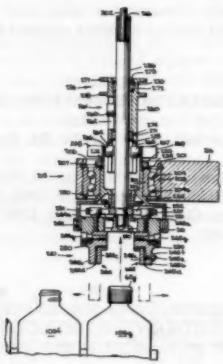
wherein said carriage includes means for deflecting at least a portion of said neck as said receiving means approaches said proximate carriage position.

4,696,144

CONTAINER CAPPER AND TORQUE TESTER

Geza E. Bankuty, and LeRoy F. Byron, both of Easton, Conn., assignors to New England Machinery, Inc., New Haven, Conn.

Filed Oct. 29, 1986, Ser. No. 924,861
Int. Cl.[4] B67B 3/20; B65B 7/28
U.S. Cl. 53—331.5 **25 Claims**

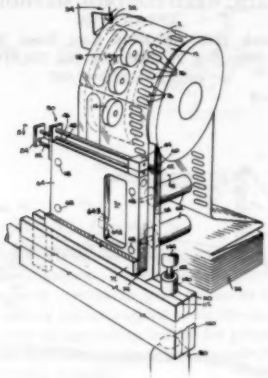


1. Apparatus for grasping and rotating container caps, comprising a rotatable head member, jaw members movably carried by said head member and movable between a first position, at which the jaw members grasp a container cap with a predetermined gripping force, and a second position, at which the jaw members release the container cap, means for moving said jaw members between said first and second positions, means for rotating said head member at a predetermined speed, means for selectively changing the predetermined speed of rotation of said head member to thereby selectively change the torque with which the cap is tightened onto a container, and means coupled between said rotating means and said jaw members and responsive to changes in torque on said jaw members for correspondingly changing the gripping force of said jaws on said cap in response to said torque change.

4,696,145
AUTOMATIC CONTAINER STUFFING APPARATUS AND METHOD

Richard Schmidt, Ambler, Pa., and Joseph A. Pizzo, Cherry Hill, N.J., assignors to Enviro-Spray Systems Incorporated, Hoboken, N.J.

Filed Jan. 13, 1984, Ser. No. 570,376
The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.
Int. Cl.⁴ B65B *1/24*
U.S. Cl. 53—436 **71 Claims**



1. Apparatus for inserting flexible sheet products into containers, each of said products comprising an expandable pouch for pressurizing a container, said pouch including burstable means for generating pressurizing gas within said pouch, said apparatus comprising:

first plate means disposed at a first location;

second plate means disposed at the first location extending parallel to and adjacent said first plate means and spaced apart therefrom, said sheet products being received between said first and second plate means;

actuating means for relatively moving said first and second plate means toward each other so as successively to compress said flexible sheet products to burst said burstable means;

means for deforming said sheet products into an elongate shape, said deforming means being disposed at a second location spaced away from said first location whereby said compressed sheet products must move from said first location to and second location to be deformed; and

means for successively inserting said deformed sheet products into the containers.

4,696,146
PACKAGING MACHINES

Friedrich D. Esch, Andover, and John G. Price, Bishop's Waltham, both of United Kingdom, assignors to AMF Incorporated, Minneapolis, Minn.

PCT No. PCT/GB85/00308, § 371 Date Mar. 6, 1986, § 102(e) Date Mar. 6, 1986, PCT Pub. No. WO86/00596, PCT Pub. Date Jan. 30, 1986
PCT Filed Jul. 11, 1985, Ser. No. 849,502
Claims priority, application United Kingdom, Jul. 12, 1984, 8417813; Aug. 2, 1984, 8419705; Nov. 15, 1984, 8428908; Nov. 15, 1984, 8428909
Int. Cl.⁴ B65B *43/28, 63/02, 43/12*
U.S. Cl. 53—529 **13 Claims**

1. A packaging machine comprising

(a) an intermittently rotatable pouch filling turret having a plurality of pouch receiving stations;

(b) a pouch supplier;

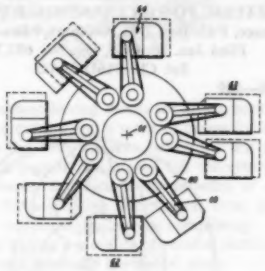
(c) a pouch transfer unit for taking empty pouches in sequence from said pouch supplier and delivering the pouches in pairs to a first receiving position of the filling turret, said pouch transfer unit

(i) including a central hub,

(ii) an even number of arms pivoted on said hub on a pitch circle concentric with the rotary axis of the hub,

(iii) a set of clamping plates at the distal ends of each of the arms, and

(iv) means for causing an oscillatory movement of said arms during rotation of the hub and relative change in angular acceleration and deceleration between pairs of



said arms whereby the clamping plates receive the pouches in sequence at a pouch receiving position and deliver adjacent pairs of pouches to said first receiving position of the filling turret,

(d) means for supplying material to be packaged in measured portions to said turret at a second receiving position of said turret,

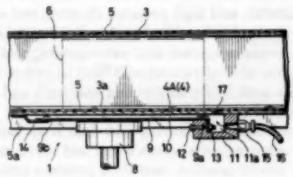
(e) means for discharging the measured portions from the turret into said pouches in pairs, and

(f) a pouch take-off device for taking off the pairs of filled pouches at a delivery position of said turret.

4,696,147
FILM TUBING DEVICE FOR USE IN PACKAGING APPARATUS

Chuji Noh, Sakai, Japan, assignor to Tokiwa Kogyo Co., Ltd., Japan

Filed Dec. 19, 1986, Ser. No. 943,932
Int. Cl.⁴ B65B *9/06*
U.S. Cl. 53—550 **6 Claims**



1. A film tubing device for use in a packaging apparatus, comprising:

a tube former arranged in a transfer path of a continuous length of a heat-meltable film having a pair of longitudinal side edges,

said former including an inner former member on which said film is wrapped with said side edges overlapping each other,

said former further including an outer former member having a longitudinal outlet through which said overlapping side edges project out,

a pair of longitudinal sealers disposed adjacent to said longi-

tudinal outlet as slightly spaced from said outer former member for nipping said overlapping side edges,

at least one of said sealers being heated for heat-sealing said overlapping side edges together,

a thin air guide plate arranged between said outer former member and at least said one of said sealers to define a clearance between said guide plate and said outer former member, and

air supplying means for feeding cooling air into said clearance.

4,696,148

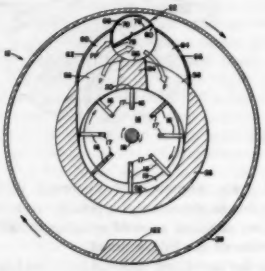
HYDRAULIC POWER TRANSMISSION SYSTEM

R. Lyle Brace, P.O. Box 2785, Gulfport, Miss. 39505

Filed Jan. 18, 1985, Ser. No. 692,714

Int. Cl.[4] F16D *39/00*

U.S. Cl. 60—489 **7 Claims**



1. A fluid continuously variable transmission system, comprising, a combination:

a body forming a chamber,

rotor means positioned in said chamber and rotatably movable relative to said body,

a power input shaft connected to said rotor means,

valve means connected to said body and movable between fully open and fully closed positions and a plurality of intermediate positions therebetween, said valve means comprising a rotary plug valve including a valve seat, said plug valve being rotatably connected to said body, and said valve seat being connected to said body,

said body forming high pressure channel means between said chamber and said valve means and low pressure channel means between said valve means and said chamber,

said chamber, said high pressure channel, and said low pressure channel being filled with a fluid capable of exerting fluid pressure against said valve means, said valve means being capable of passing said fluid to create a closed fluid circuit with said chamber and said high and low pressure channel means,

said rotor means pressuring said fluid from said chamber to said valve means wherein when said valve means is in said fully closed position, said fluid pressure causes said valve means and said body to rotate with the rotational speed of said input shaft; wherein when said valve means is in said fully open position, said fluid passes through said valve means to said chamber and said body is immobile relative to said input shaft and said rotor means; and wherein when said valve means is in any of said intermediate positions, a first portion of said fluid applies pressure against said valve means and a second portion of said fluid passes through said valve means to said chamber, the relation between said first and second fluid portions being proportional to the degree of closing of said valve means,

a power output shaft,

means for connecting said body with said output shaft;

support means at said input shaft and said output shaft for rotatably supporting said body, and

control means connected to said body for adjusting said valve means between said open and closed positions in accordance with torque requirements of said output shaft, wherein the speed of said output shaft can be varied relative to the speed of said input shaft in a plurality of speed ratios between a ratio of one-to-one and a ratio of one and a preselected multiple of one, respectively.

4,696,149

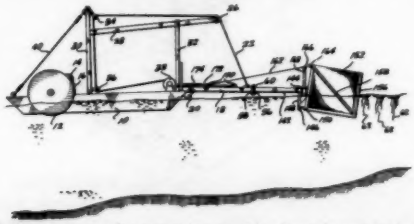
AQUATIC WEED CONTROL METHOD AND APPARATUS

James L. Hawk, 22435 SE. 288th, Kent, Wash. 98031

Filed Sep. 27, 1985, Ser. No. 780,919

Int. Cl.[4] A01D *44/00*

U.S. Cl. 56—8 **4 Claims**



1. An apparatus for removing aquatic plants from a body of water comprising:

a floating hull;

an elongate boom pivotally attached at a first end thereof to a forward end of said hull;

rigging means associated with said hull and said boom for raising and lowering said boom about said point of pivotal attachment of said boom to said hull;

a first implement for mounting on a second end of said boom, said first implement including a drag bar oriented transversely to said boom;

implement-mounting means associated with the second end of said boom constructed and arranged to removably connect an implement to said boom;

a second implement, said second implement constructed and arranged for attachment to said boom by said implement-mounting means in the absence of said first implement, said second implement including a scoop of foraminous material, one side of said scoop being open to receive weeds and a second side closed to provide resistance to said weeds to keep them in said scoop, said second implement further including an auxiliary boom in line with said elongate boom, a first end of said auxiliary boom being adapted to be connected to said elongate boom by said implement-mounting means and a second end of said auxiliary boom having said scoop pivotally mounted thereto, said scoop being movable between the normal position and a dumping position; and

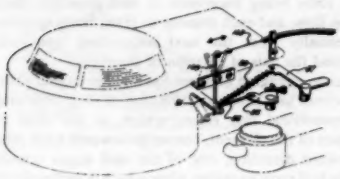
pivot control means associated with said elongate boom and said scoop and operable to move said scoop between said normal and dumping positions, said pivot control means including a cable attached at a first end thereof to said scoop and a second end of the cable being attached to a block and tackle, said block and tackle being associated with a hydraulic actuator mounted on said elongate boom such that the input side of said block and tackle is connected to one end of a piston movably mounted in said hydraulic actuator, said actuator and said block and tackle cooperably connected such that a movement of one unit of linear measure by said piston is amplified by said block and tackle to cause a movement of greater than one measuring unit by said first end of said cable.

4,696,150

POWER MOWER WITH BLADE-BRAKE CLUTCH

Joseph S. Geeck, III, 6355 Jefferson Hwy., Harahan, La. 70123

Filed Apr. 23, 1982, Ser. No. 371,235
Int. Cl.[4] A01D *69/10*
U.S. Cl. 56—11.3 4 Claims



1. In a power mower operated by an operator who walks behind it, the mower having a wheeled body, a gasoline engine mounted on the body, a rotatable shaft driven by the engine, rotatable grass-cutting means adapted to be driven by power from said shaft, and an upstanding handle for grasping by the operator to guide the mowing, the improvement wherein said power mower further includes:

(a) a centrifugal cluth interposed between said drive shaft and said cutting means;

(b) a manually actuatable engine control associated with said handle and connected so that upon and during actuation the control enables the engine to be operated at a predetermined rate of speed at least high enough for the centrifugal clutch to engage, and upon termination of such actuation of the control, it causes the engine to operate at a predetermined rate of speed at least low enough for the centrifugal clutch to disengage; and

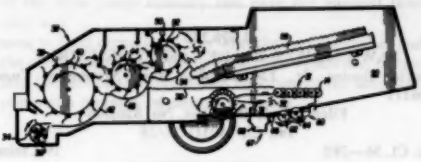
(c) brake means including a V-groove drum that rotates with the grass-cutting means, as well as a V-belt sized to fit the V-groove but fixed so that it cannot rotate with the groove, said brake means being connected to the control and to the grass-cutting means to stop rotation of said cutting means concurrently with the disengagement of the centrifugal clutch when the control is not actuated, the engine control including a governor system comprising a pivotable governor arm linked to a carburetor throttle control and to a spring that urges said arm toward a position wherein the carburetor throttle control is at a setting causing the engine to operate in a preselected normal clutch-engaging operating speed range, and the engine control further including a push-pull actuator cable moveable in response to manual actuation and termination of manual actuation of said control by the operator, and a pivotal lever linked to said push-pull actuator cable and positioned so that (i) upon manual actuation of said engine control by the operator said cable causes said lever to release from said arm so that the force of said spring moves said arm to a position wherein the carburetor speed control is at a setting causing the engine to operate in a preselected normal operating speed range, and (ii) upon termination of manual actuation of said engine control by the operator said actuator cable causes said lever to apply a force upon said arm overriding the force of said spring and to force said arm against the urging of said spring to a position wherein it holds the carburetor speed control at a setting causing the engine to operate in a preselected low speed or idle range.

4,696,151

SEPARATOR SYSTEM FOR PEANUT COMBINE

Oliver K. Hobbs, Suffolk, Va., assignor to Hobbs-Adams Engineering Company, Suffolk, Va.

Filed Oct. 2, 1985, Ser. No. 783,133
Int. Cl.[4] A01F *12/44*; A01D *41/00*
U.S. Cl. 56—14.6 16 Claims



1. A peanut combine having means for lifting peanut-carrying vines from the ground and a series of means for thrashing the peanuts from the vine, a screen below the last thrashing means which will permit peanuts to fall therethrough and retain vine remnants, and means downstream of said last thrashing means for separating the peanuts from associated foreign material, said separating means comprising:

a disk separator having a plurality of parallel shafts mounted for rotation in a generally horizontal plane;

each shaft carrying a plurality of disks spaced along its length, with the distance between adjacent shafts and the spacing of the disks along adjacent shafts being such that the disks interdigitate to form a plurality of openings between adjacent disks of a size and shape which will permit a peanut to pass therethrough and the space between each disk periphery and the adjacent shaft defining a close fit so that a peanut cannot pass therethrough;

means for driving said shafts so that they all rotate in the same direction; and

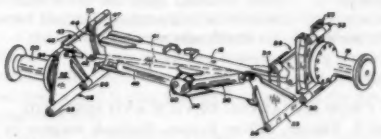
blower means for directing a stream of air to pass upwardly and rearwardly through said disk separator, said stream of air being of a velocity to carry lightweight foreign material up and away from the disk separator so that it does not pass therethrough, but permitting passage of peanuts through the openings.

4,696,152

APPARATUS FOR LEVELING A COMBINE

Jon E. Kinzenbaw, R.R. 1, Box 184, Williamsburg, Iowa 52361

Filed Sep. 20, 1985, Ser. No. 778,532
Int. Cl.[4] A01D *41/12*, *75/28*
U.S. Cl. 56—209 9 Claims



1. In an agricultural implement having a frame with an axle, apparatus for maintaining said axle in a generally horizontal disposition, comprising: first and second support wheel means for the left and right side of said axle respectively; first and second wheel linkage means for mounting said first and second support wheel means respectively to the left and right sides of said axle and for maintaining the respective axes of rotation of said wheel means generally parallel to the axis of said axle, said first and second wheel linkage means each comprising a four-bar linkage; synchronizing means for synchronizing the movement of said first and second wheel linkages means such that vertical movement of one of said support wheel means relative to said axle will cause the other wheel linkage means to move

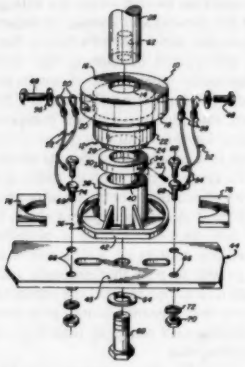
its associated support wheel means relative to said axle substantially the same distance as, but in an opposite vertical direction to the movement of said first support wheel means; and power means connected between said frame and at least one of said wheel linkage means for actuating the same and causing the associated support wheel means to move in a vertical direction relative to said axle for causing said associated wheel means to move vertically relative to said axle.

4,696,153

LAWN MOWER BLADE SAFETY ASSEMBLY

Maurice Boains, Jr., 124 Audubon Ave., Newington, Conn. 06111

Filed Feb. 5, 1986, Ser. No. 826,306
Int. Cl.[4] A01D *55/18*
U.S. Cl. 56—295 **19 Claims**



1. A fail-safe system for the blade of a power-driven rotary lawn mower or the like, comprising:

a bearing assembly comprised of an attachment member and a hub member journalled therewithin, said assembly having an axial passageway therethrough for slideable and rotatable mounting upon a cylindrical drive shaft;

a retainer adapted for affixation to the drive shaft adjacent said bearing assembly, said retainer and assembly being so constructed as to permit engagement of said hub member with said retainer, free from interference with said attachment member; and

means adapted to symmetrically connect said attachment member to a blade mounted upon the drive shaft of a rotary lawn mower with said retainer disposed between the blade and said attachment member.

4,696,154

CROP ENGAGING DEVICE AND METHOD

Wilfred E. Klinner, Milton Keynes, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 477,872, Mar. 23, 1983, Pat. No. 4,545,188. This application Aug. 7, 1985, Ser. No. 763,222
Claims priority, application United Kingdom, Mar. 26, 1982, 8209019
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] A01D *82/00*
U.S. Cl. 56—364 **11 Claims**

1. Apparatus for picking up and conveying grass or other fibrous crop comprising

a mobile frame for movement over the ground,

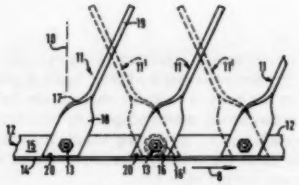
a rotor mounted on the frame for picking up and conveying crop,

drive means for driving the rotor in rotation in a sense such that the rotor picks up cut crop and carries the crop upwardly and rearwardly over the rotor,

a housing extending at least around part of the front half of the rotor and forming with the rotor a crop flow passage between the rotor and the housing along which the crop is conveyed by the rotor,

said rotor having a plurality of crop engaging elements arranged in a series of transverse arrays each of which extends in a direction transverse to the principal direction of crop flow through the apparatus, the axis of rotation of the rotor being transverse to said principal direction of crop flow, and each transverse array being spaced circumferentially from the next succeeding transverse array around the axis of rotation of the rotor,

each crop engaging element having a principal plane which traverses said principal direction of crop flow and having asymmetrical side edges which, at the crop engaging region of the element, converge towards each other in the outward direction, one of the said edges constituting a principal crop engaging edge which is inclined away from



a plane perpendicular to the rotor axis, the elements of each array being arranged with a number of adjacent elements along the array being similarly inclined in that said principal crop engaging edges thereof are all inclined away from said plane in the same sense, the prevailing sense of inclination of each transverse array being the same as the prevailing sense of inclination of the next succeeding transverse array around the circumference of the rotor, said similarly inclined elements acting on said crop to produce a prevailing alignment of the strands of the fibrous crop generally transverse to said principal direction of crop flow through the apparatus,

each crop engaging element being unsharpened and being arranged to engage and convey the crop substantially without cutting of the crop, each element being resiliently yieldable upon contact with an abnormal load and being mounted with sufficient stiffness for the elements to be capable of returning after yielding to their undeflected dispositions at least predominantly by virtue of resilience without sole reliance on centrifugal effect.

4,696,155

FRICTION SPINNING DEVICE CONTAINING A FRICTION SPINNING MEANS AND METHOD OF USE OF THE FRICTION SPINNING DEVICE

Herbert Stalder, Kollbrunn; Arthur Würmli, Winterthur; Josef Baumgartner, Sirnach, and Emil Briner, Winterthur, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Jun. 16, 1986, Ser. No. 874,522
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1985, 3521665
Int. Cl.[4] D01H *1/135, 7/885*
U.S. Cl. 57—401 **13 Claims**

1. A friction spinning device for production of a yarn or the like comprising:

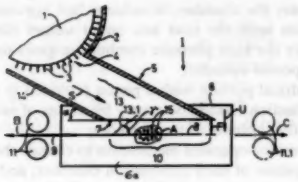
a perforated friction spinning means having a yarn formation position;

means defining a pneumatic fiber transport passage for transporting freely-floating fibers onto the friction spinning

means for forming said freely-floating fibers into a yarn at said yarn formation position;

means for withdrawing said formed yarn in a predetermined withdrawal direction;

said pneumatic fiber transport passage having an opening disposed in a predetermined position relative to said yarn formation position and at a predetermined spacing therefrom;



said pneumatic fiber transport passage being inclined to said yarn formation position at an angle substantially between 5° and 90°; and

the perforated friction spinning means having perforations arranged such that straight lines joining individual ones of said perforations are inclined relative to said yarn formation position in a sense opposite to said inclined pneumatic fiber transport passage and define relative to said yarn formation position an angle substantially between 0° and 90°.

4,696,156

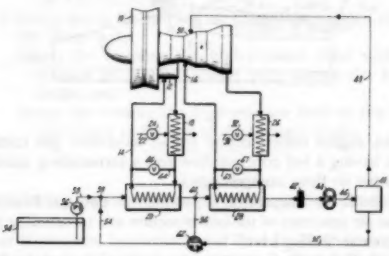
FUEL AND OIL HEAT MANAGEMENT SYSTEM FOR A GAS TURBINE ENGINE

Donald N. Burr, Glastonbury; Paul S. Danilowicz, Manchester; Thomas C. Franz; Thomas P. Mortimer, both of Bolton, and Edward B. Pero, Somers, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 3, 1986, Ser. No. 870,192

Int. Cl.[4] F02C *7/06, 7/224*

U.S. Cl. 60—39.08 **7 Claims**



1. A system for transferring heat energy among a heat generating gas turbine engine, a heat generating accessory drive coupled to the gas turbine engine, a stream of fuel flowing at a metered flow rate, and a stream of cooling air, comprising:

a first oil circulation loop wherein a first flow of oil circulates through the accessory drive, a first air-oil cooler having a first, regulated portion of the cooling air stream also passing therethrough, and a first fuel-oil heat exchanger;

a second oil circulation loop wherein a second flow of oil circulates through the gas turbine engine, a second air-oil cooler having a second, regulated portion of the cooling air stream also passing therethrough, and a second fuel-oil heat exchanger;

means for conducting at least a portion of the metered fuel stream, in sequence, through the first fuel-oil heat exchanger, the second fuel-oil heat exchanger, and a main fuel pump, the main fuel pump operating at a fuel delivery rate in excess of the metered fuel flow rate;

a fuel controller for receiving the fuel flowing from the main fuel pump and dividing the received fuel between a supply stream having a flow rate equal to the metered flow rate, and a bypass stream having a flow rate equal to the excess of the main pump delivery rate over the metered flow rate; and

means, in fluid communication with the fuel controller and the conducting means, for returning the bypass fuel stream into the fuel conducting means upstream of the main fuel pump at a plurality of distinct locations.

4,696,157

FUEL AND AIR INJECTION SYSTEM FOR A TURBOJET ENGINE

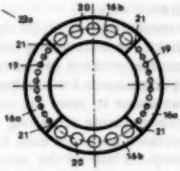
Gerard Y. G. Barbier, Morangis; Gerald J. P. B. Lebouré, Avon; Michel A. A. Desaulty, Vert St Denis; Rodolphe Martinez, Perigny/Yerres, and Jérome Perigne, Vaux le Penil, all of France, assignors to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation "S.N.E.C.M.A.", Paris, France

Filed Oct. 15, 1986, Ser. No. 919,126

Claims priority, application France, Oct. 18, 1985, 85 15925

Int. Cl.[4] F02C *3/14*

U.S. Cl. 60—39.23 **9 Claims**



1. In a turbojet engine having a combustion chamber, at least one fuel injector to inject fuel into an upstream end of the combustion chamber, at least one external swirl vane passing air into the combustion chamber to create a turbulent fuel/air mixture, and a first diaphragm control means to modulate the intake air of the external swirl vane, the improved fuel and air injection system comprising:

(a) a bowl shaped member mounted adjacent to an upstream end of the combustion chamber, the bowl shaped member defining air inlet means, and an impact cooling chamber communicating with the air inlet means and having a downstream wall flaring radially outwardly in the downstream direction;

(b) a plurality of generally radially extending partitions extending through the cooling chamber and dividing the chamber into a plurality of pairs of sectors, each sector of the pair being located diametrically opposite the other sector of the pair;

(c) a first plurality of openings defined by the downstream wall and located in a first pair of sectors so as to communicate with the cooling chamber and the combustion chamber; and,

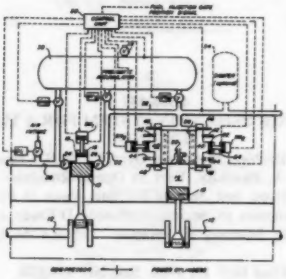
(d) a second plurality of openings defined by the downstream wall and located in a second pair of sectors so as to communicate with the cooling chamber and the combustion chamber, wherein the sizes of the second plurality of openings are greater than the sizes of the first plurality of openings.

4,696,158

INTERNAL COMBUSTION ENGINE OF POSITIVE DISPLACEMENT EXPANSION CHAMBERS WITH MULTIPLE SEPARATE COMBUSTION CHAMBERS OF VARIABLE VOLUME, SEPARATE COMPRESSOR OF VARIABLE CAPACITY AND PNEUMATIC ACCUMULATOR

Roberto F. DeFrancisco, Cra. 6a. No. 30A-30, 2nd Floor, c/o Ingetec, Bogota, D. E., Colombia

Continuation-in-part of Ser. No. 431,733, Sep. 29, 1982, abandoned. This application Oct. 18, 1985, Ser. No. 789,772
Int. Cl.[4] F02G 1/02
U.S. Cl. 60—39.62 3 Claims



1. An internal combustion engine comprising:

an air compressor of variable capacity, having means to change its clearance volume;

control means, pressure responsive, for regulating the output of said compressor for maintaining constant, at a certain adjustable value, the pressure of the compressed air supplied from said compressor for combustion purposes;

a pneumatic accumulator to store the compressed air from said air compressor during a braking mode of operation when the compressed air is not used for combustion purposes, for subsequent use of the stored compressed air during super power output modes of operation of the engine;

a plurality of combustion chambers of variable volume;

a discharge header coupled to said compressor to convey compressed air to said combustion chambers and having discharge header air duct branches leading to said accumulator;

an air duct to communicate said accumulator with an intake of said compressor;

servovalves provided at said air ducts of the accumulator;

said control means comprising means for: being effective during said braking mode of operation to open one of said servovalves for allowing compressed air to enter said accumulator; being effective during one of said super power output modes of operation to control respective ones of said servovalves for allowing the stored compressed air, when in a sufficiently high pressure range, to exit said accumulator and feed the combustion chambers described herein below; and being effective during other of said super power output modes of operation to control respective ones of said servovalves for allowing compressed air, when in a low pressure range, to exit said accumulator and feed said compressor;

power cylinders of positive displacement, each provided with a reciprocating piston driven by high pressure combustion gases during each power stroke, each of said power cylinders including exhaust valve means, for allowing combustion gases to exit the cylinder during the upstroke of said reciprocating piston, and having inlet openings for allowing high pressure combustion gases to enter the cylinder during power strokes;

said plurality of combustion chambers being located externally of said power cylinders, with at least two of said combustion chambers associated with each one of said power cylinders for supplying combustion gases alternately from said combustion chambers to the respective power cylinder;

fuel injection means with a fuel injection gate and valve means including inlet and outlet valves provided for each of said combustion chambers for allowing compressed air to enter the chamber, to achieve fuel injection and combustion with the inlet and outlet valves closed, and to supply the high pressure combustion gases to the respective power cylinder;

a cylindrical portion with a piston provided in each of said combustion chambers to vary by means of said piston the effective volume of the chamber;

a servomotor-operated mechanism to change the position of said piston of each combustion chamber; and

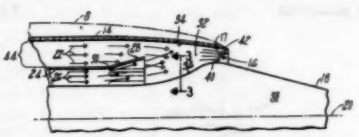
said control means including means for being made adjustable and responsive to position of the fuel injection gate in said fuel injection means, for commanding said servomotor in order to change by means of said piston the volume of each of said combustion chambers in proportion to the fuel charge injected in the chamber, in this manner maintaining constant the air/fuel ratio at any load or power output of the engine.

4,696,159

GAS TURBINE OUTLET ARRANGEMENT

John J. Horgan, Wethersfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 4, 1986, Ser. No. 892,532
Int. Cl.[4] F02K 3/02
U.S. Cl. 60—226.1 6 Claims



1. An engine outlet section for an axial-flow gas turbine engine having a hot core gas flow and a surrounding annular bypass fan air flow, comprising:

an annular flow separator, separating the core gas from the fan air upstream of the outlet section and terminating at a circular trailing edge;

an annular mixer, secured to the trailing edge of the flow separator, the mixer including a plurality of alternately radially inwardly and outwardly extending flow lobes, the outwardly extending lobes having a small radial height relative to the radial height of the fan air flow annulus;

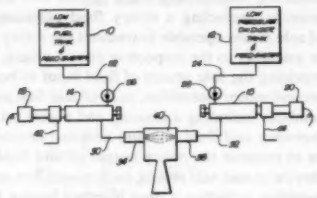
an axial nozzle plug, disposed downstream of the annular mixer and having a diameter increasing with axial downstream displacement to a maximum diameter greater than or equal to the diameter of the trailing edge of the flow separator, said plug diameter decreasing with further downstream axial displacement; and

an outer annular engine fairing, confining the fan air upstream of the convoluted mixer and confining the mixing fan air and core gas flow downstream of the mixer, the outer engine fairing further terminating at a downstream edge at a point axially proximate the maximum diameter of the nozzle plug.

4,696,160
PRESSURE PUMP AND INJECTOR VALVE SYSTEM FOR LIQUID-PROPELLANT ENGINES

Nahum Gat, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 14, 1985, Ser. No. 734,005
Int. Cl.[4] F02K *9/00*
U.S. Cl. 60—258 **3 Claims**



1. A propellant delivery system for use in a liquid-propellant rocket, the system comprising:

a solenoid-actuated high-pressure pump, for delivering bursts of high-pressure liquid propellant obtained from a low-pressure propellant storage tank; and

a pressure-actuated injector valve installed in an inlet nozzle to a rocket engine combustion chamber, and coupled to the pump to receive the bursts of high-pressure liquid propellant, and to atomize the propellant as it enters the combustion chamber;

and in which the high-pressure pump includes

a generally cylindrical pump body having an axial passage through it, an inlet port at one end of the axial passage, for connection to the low-pressure propellant tank, a first outlet port for connecting the axial passage to the injector valve, and a second outlet port for connecting the axial passage with a return line,

a hollow plunger mounted for sliding movement within the axial passage,

a solenoid for moving the plunger axially in a forward stroke in the pump body,

a one-way check valve connected to prevent reverse flow through the inlet port and permit pressure to rise during the forward stroke,

a return spring for moving the plunger in a return stroke in the pump body,

means for coupling the high-pressure fluid within the plunger to the first outlet port during the forward stroke, and

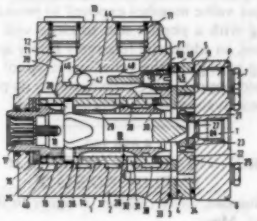
means for venting the high-pressure fluid to the second outlet port at the end of the forward stroke.

4,696,161
CONTROL DEVICE FOR HYDROSTATIC STEERING MEANS

Ivar Rasmussen, Sonderborg, and Poul H. H. Pedersen, Nordborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Mar. 3, 1986, Ser. No. 835,570
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507901
Int. Cl.[4] F16D *31/02*; F01C *1/02*
U.S. Cl. 60—384 **8 Claims**

1. A hydrostatic power steering unit, comprising, an outer internally toothed ring gear, an inner externally toothed gear being in orbital and rotational engagement therewith, said gears forming compression chambers therebetween upon relative movement between said gears, an end plate on one side of said ring gear in juxtaposition thereto, a valve unit on the other side of said ring gear having a housing in juxtaposition thereto, said cover plate having at the outer surface thereof a fluid inlet pump connection and a fluid outlet drain connection and a pair of motor connections, said housing having a bore which is coaxial relative to said ring gear, valve means including inner and outer sleeve members rotatably mounted in said bore, said sleeve members having a rotational movement therebetween for changing valve settings therebetween to selectively generate directional control pressures in said pair of motor connections, said valve means including cooperating fluid passage means in said housing and said sleeve members and being operable to connect said fluid inlet pump connection selectively to either of said motor connections while connecting the other of said motor connections to said fluid outlet drain connection, said inner sleeve member having coupling means for connection to a steering control member, said externally toothed gear having a central bore, a cardan shaft and coupling

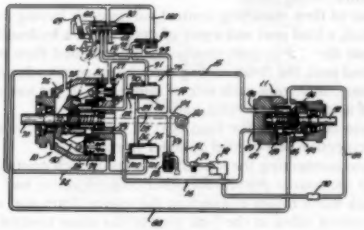


means connecting one end thereof to said outer sleeve member for rotation therewith and the other end thereof to said externally toothed gear for rotational and orbital movement therewith, said ring gear having axially extending bores extending through the teeth thereof, screws for attaching said end plate to said ring gear and said valve housing extending through some of said ring gear bores, said fluid passage means including one of said ring gear bores for providing fluid communication between said fluid supply pump connection and said valve means, and said fluid passage means including two of said ring gear bores for providing fluid communication between said pair of motor connections and said pump and drain connections.

4,696,162
MULTI-FUNCTION VALVE

Keith R. Williams, Nevada, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Division of Ser. No. 610,085, May 9, 1984, Pat. No. 4,617,797.
This application Jul. 17, 1986, Ser. No. 886,348
Int. Cl.[4] F16D *31/02*
U.S. Cl. 60—433 **7 Claims**



1. A hydrostatic transmission having a pair of hydraulic displacement units connected in a closed loop circuit by a pair of pressure lines with one of the units being of variable displacement and having bypass means, said bypass means comprising, a valve body with a bore and a pair of valve seats, a charge check valve having a poppet valve member associated with one valve seat to block flow between said bore and a first port, a relief valve having a hollow relief valve spool movably positioned within said poppet valve member and having an end

wall abutting a transverse wall of said poppet valve member, a spring acting on said relief valve spool to urge said valve members into abutting relation and the poppet valve member against its valve seat, said poppet valve member having a passage in the transverse wall thereof communicating with said first port, said relief valve spool end wall having an orifice opening to said first port through said transverse wall passage, a charge pressure port in said valve body opening to said bore, passage means in the wall of said poppet valve member connecting the interior of said poppet valve member with the bore exteriorly of the poppet valve member, said relief valve spool blocking said passage means when the valve members are in abutting relation, a servo port, passage means connecting the interior of the hollow relief valve spool with the servo port, a second poppet valve member exposed to pressure in said interior coacting with a poppet seat to close said last-mentioned passage means, an additional relatively heavy spring compared to the spring acting on the relief valve spool for urging the last-mentioned poppet valve member onto its poppet seat, and means for deactivating said additional spring.

4,696,163

CONTROL VALVE AND HYDRAULIC SYSTEM EMPLOYING SAME

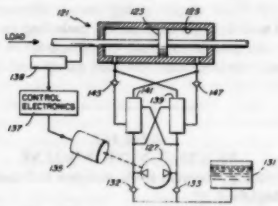
J. Robert Glomeau, Dover, Mass., assignor to REXA Corporation, Dover, Mass.

PCT No. PCT/US84/00448 § 371 Date Nov. 16, 1984 § 102(e) Date Nov. 28, 1984, PCT Pub. No. WO 84/03916, PCT Pub. Date Oct. 11, 1984. PCT Filed Mar. 22, 1984.

Continuation-in-part of Ser. No. 479,672, Mar. 28, 1983, Pat. No. 4,557,180, and Ser. No. 479,673, Mar. 28, 1983, Pat. No. 4,625,513. This application Nov. 16, 1984, Ser. No. 674,537

Int. Cl.[4] F15B *13/04, 9/03*

U.S. Cl. 60—476 **2 Claims**



1. A hydraulic system comprising:

a double acting piston and cylinder having first and second ports accessing opposite sides of the piston;

a bidirectional pump;

a pair of flow matching control valves each having a source port, a load port and a pair of drain ports, a hydraulic flow into the source port producing a controlled flow into the load port, the flows exiting through respective drain ports;

means connecting each side of said pump to the source port of a respective control valve;

means connecting the load port of each control valve to a respective one of said cylinder ports;

means connecting the load drain ports of each control valve to the source port of the other control valve; and

check valve means connecting the source drain port of each control valve to the load port of the other control valve.

4,696,164

HYDROSTATIC TRANSAXLE AND LOCKING DIFFERENTIAL AND BRAKE THEREFOR

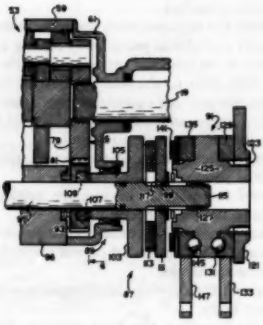
David W. Giere, Chaska, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 26, 1985, Ser. No. 769,033

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—485 **16 Claims**

1. A hydrostatic transaxle assembly for use on a vehicle having a source of motive power, a fluid pump driven by said source of power, and a pair of driven wheels; said transaxle assembly comprising manifold means and first and second motor assemblies; said manifold means defining a fluid inlet adapted to be in fluid communication with the fluid outlet of the pump, and a fluid outlet adapted to be in fluid communication with the fluid inlet of the pump, and fluid passage means communicating between said fluid inlet and said fluid outlet of said manifold means, and flowing through said first and second motor assemblies, respectively; each of said first and second motor assemblies including a rotary fluid pressure actuated device and axle means operable to transmit the rotary output of said motor assembly to the respective driven wheel; said fluid pump comprising the sole source of fluid input to both of said first and second motor assemblies; each of said first and second motor assemblies including a housing and a gear set operably disposed between said fluid pressure actuated device and said axle means to transmit the rotary output of said fluid pressure actuated device to said axle means; each of said first and second motor assemblies including a gear member having its axis of rotation fixed relative to said housing of the respective motor assembly and a speed of rotation representative of the speed of rotation of the respective motor assembly; characterized by:



(a) interwheel differential means comprising first and second lock gear members in toothed engagement with said gear members of said first and second motor assemblies, respectively;

(b) said differential means further comprising engagement means operably associated with said first and second lock gear members, and including a single clutch means operable to fix said first and second lock gear members relative to each other; and

(c) actuation means operably associated with said engagement means and selectively operable to move said engagement means between:

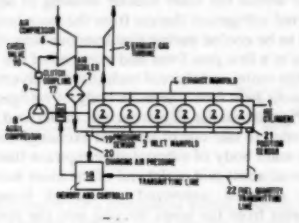
(i) a first position in which said first and second lock gear members are free to rotate relative to each other, thus permitting normal differentiation between said first and second motor assemblies and the speeds of the driven wheels; and

(ii) a second position in which said first and second lock gear members are fixed relative to each other, thus preventing said normal differentiation between said first and second motor assemblies and the speeds of the driven wheels.

4,696,165
SUPERCHARGING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Jakob Bucher, Bobingen, Fed. Rep. of Germany, assignor to M.A.N.-B&W Diesel GmbH, Augsburg, Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,520
Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443324
Int. Cl.[4] F02B 37/04
U.S. Cl. 60—609 8 Claims



1. Supercharging control system for an internal combustion engine (ICE) (1) having

an exhaust gas turbine (5) driven by exhaust gases from the ICE (1);

a main air compressor (6) driven by the exhaust gas turbine (5) and providing compressed air to an inlet manifold (3) of the ICE (1),

an auxiliary air compressor (8) driven by rotary power derived from the ICE to provide additional air to said main compressor (6);

a controlled clutch (17) drivingly connected to the auxiliary compressor (8) and the ICE (1) to selectively establish or disconnect rotary drive power between the ICE (1) and the auxiliary compressor (8);

fuel quantity sensing means (21) for sensing quantity of fuel being supplied to the ICE (1) and providing a fuel quantity signal (F);

air pressure sensing means (19) coupled to an air inlet (3) of the ICE for sensing charging air pressure and providing an air pressure signal (P);

and comprising ;

a memory and controller (18) coupled to control, selectively, establishment and disconnection of the rotary drive power between the ICE and the auxiliary compressor, and wherein

said memory and controller is coupled to receive the air pressure signal (P) and the fuel quantity signal (F) and storing the relationship between air supply pressure and fuel quantity for desired performance of the ICE;

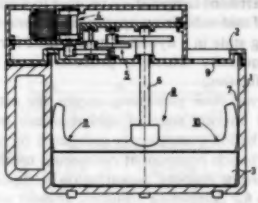
said memory and controller (18) provides an output signal coupled to and controlling the controlled clutch (17) to obtain said desired performance;

and wherein said main compressor (6) comprises a centrifugal compressor including nozzles (14) positioned about the outer circumference of a chamber within which rotary blades (15) of the centrifugal compressor operate, said nozzles (14) receiving compressed air from the auxiliary compressor (8) and being oriented to apply additional drive power to the main compressor (6).

4,696,166
ICE-CREAM MAKER

Romuald L. Bukoschek, and Reinhard Huszar, both of Klagenfurt, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 23, 1986, Ser. No. 877,630
Claims priority, application Austria, Jun. 26, 1985, 1902/85
Int. Cl.[4] A23G 9/12
U.S. Cl. 62—136 6 Claims



1. An ice-cream maker comprising:

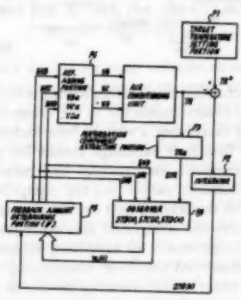
a cylindrical container provided with at least one cooled surface for ice-cream formation, a shaft positioned concentrically within said container, an autosynchronous single-phase electric motor driving said shaft through a gear unit;

a scraper and stirrer tool mounted on said shaft and coacting with the cooled surface, said scraper and stirrer tool including for each direction of rotation of the shaft, at least one section effective substantially in the direction of rotation, said sections positioned symmetrically with respect to a plane of symmetry through said shaft.

4,696,167
AIR CONDITIONER FOR AUTOMOBILES

Katsumasa Matsui; Masahiro Ohba, both of Okazaki; Tohru Kakehi, Nagoya, and Takayoshi Kawai, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 18, 1985, Ser. No. 789,013
Claims priority, application Japan, Oct. 19, 1984, 59-220769; Mar. 26, 1985, 60-62714; Mar. 27, 1985, 60-64581; Mar. 27, 1985, 60-64582; Apr. 5, 1985, 60-73198
Int. Cl.[4] F25D 17/00; G05B 13/04
U.S. Cl. 62—180 19 Claims



1. An air conditioner for a vehicle, comprising:

(a) air duct means for supplying a vehicle compartment with air;

(b) supply heat quantity controlling means for controlling an amount of heat of the air supplied from said air duct means to said vehicle compartment;

(c) temperature setting means for setting a target temperature for air in said vehicle compartment;

(d) compartment temperature detecting means for detecting an actual temperature of air in said vehicle compartment as a detected compartment temperature;

(e) deviation computing means for computing the temperature deviation of said detected compartment temperature from said target temperature;

(f) temperature perturbation component computing means for computing perturbation components of said detected compartment temperature relative to a reference temperature of said vehicle compartment under a steady air-conditioning state in a dynamic model used for controlling said heat quantity which is predetermined through system identification;

(g) internal state estimating means for estimating an estimated internal state of said dynamic model using said perturbation components computed by said temperature perturbation component computing means;

(h) adjusting amount perturbation component computing means for computing adjusting amount perturbation components of said supply heat quantity controlling means relative to a reference adjusting amount under said steady air-conditioning state in said dynamic model on the basis of said temperature deviation computed by said deviation computing means and said estimated internal state of said internal state estimating means; and

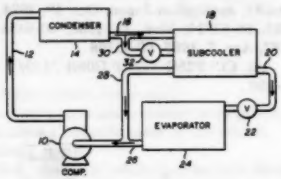
(i) control adjusting amount determining means for determining an adjusting amount of said amount of heat of air on the basis of said adjusting amount perturbation components and said reference adjusting amount.

4,696,168

REFRIGERANT SUBCOOLER FOR AIR CONDITIONING SYSTEMS

Donald R. Woods, and Helga S. Woods, both of Nederland, Tex., assignors to Roger Rasbach, Houston, Tex.

Filed Oct. 1, 1986, Ser. No. 913,919
Int. Cl.[4] F25B *41/00*
U.S. Cl. 62—200 **16 Claims**



1. In an air conditioning system having a compressor, a first heat exchange means connected to the compressor for receiving refrigerant therefrom, a second heat exchange means connected to the first heat exchange means for receiving liquid refrigerant therefrom; and suction line means between the second heat exchange means and the compressor for routing refrigerant from the second heat exchanger means to the compressor; an improved refrigerant subcooler for at least one of said heat exchange means for supplying subcooled refrigerant thereto, said improved subcooler comprising:

an elongate outer tubular housing having an inlet end and an outlet end for refrigerant to said one of said heat exchange means;

an elongate inner tubular housing positioned within said outer tubular housing in a generally concentric relation to said outer tubular housing and defining an annulus between the outer periphery of said inner housing and the inner periphery of said outer housing, said inner housing having an inlet end and an outlet end in inwardly spaced relation to the respective inlet and outlet ends of said outer housing;

a refrigerant main supply line connected to said inner tubular housing adjacent the inlet end thereof to supply refrigerant to be cooled to said inner tubular housing;

a refrigerant inlet branch line diverging from the main supply line adjacent the inlet end of the inner housing and connected to the inner tubular housing to divert a relatively small portion of the main body of refrigerant from the main supply line to the inner tubular housing for flowing from the inlet end to the outlet end of said inner housing and cooling the main body of refrigerant therein;

an expansion valve in said inlet branch line adjacent the inlet end of said inner housing for vaporizing the refrigerant therein;

means within the inner tubular housing to separate the diverted refrigerant therein from the main body of refrigerant to be cooled during simultaneous flow of the refrigerants in a first pass from said inlet end of the inner housing to the outlet end thereof such that the diverted refrigerant absorbs heat from the main body of refrigerant;

a refrigerant outlet line from the outlet end of said inner housing to said one of said heat exchange means to supply the main body of subcooled refrigerant thereto;

means adjacent said outlet end of the inner housing to direct the diverted vaporized refrigerant being discharged thereat from the inner housing into the annulus between the inner and outer housings for a second reverse pass of the vaporized refrigerant in an opposite direction along the annulus from the outlet end of said inner housing to said inlet end thereof such that the vaporized refrigerant in the annulus absorbs heat from the refrigerant within the inner housing during flow along the annulus; and

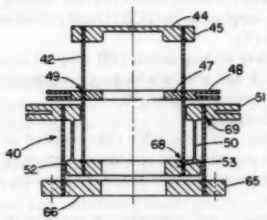
outlet line means adjacent said inlet end of said inner housing to conduct the flow of gaseous refrigerant from the annulus to said suction line means for flow to the compressor.

4,696,169

CRYOGENIC SUPPORT MEMBER

Ralph C. Niemann, Downers Grove; John D. Gonczy, Oak Lawn, and Thomas H. Nicol, Aurora, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 15, 1986, Ser. No. 863,492
Int. Cl.[4] F25B *19/00*
U.S. Cl. 62—514 R **19 Claims**



1. A cryogenic support member for restraining a cryogenic system comprising;

a rod having a depression at a first end, said rod being made of non-metallic material, said non-metallic material having an effectively low thermal conductivity;

a metallic plug; and

a metallic sleeve,

said plug and said sleeve shrink-fitted to the depression in said rod and assembled thereto such that said plug is disposed inside the depression of said rod, said sleeve is disposed over the depression in said rod and said rod is clamped therebetween, the shrink-fit clamping said rod

being generated between said metallic plug and said metallic sleeve.

4,696,170

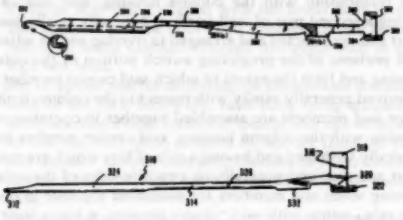
COMPOUND KNITTING NEEDLE

E. C. Tibbals, Jr., Rt. 2, Box 386, High Point, N.C. 27260

Division of Ser. No. 398,303, Jul. 14, 1982, abandoned. This application Nov. 26, 1985, Ser. No. 761,766

Int. Cl.[4] D04B *35/06*

U.S. Cl. 66—120 **21 Claims**



8. A needle element for a compound knitting needle member formed of such needle element and a closing element comprising an elongate body portion having knitting hook means at one terminal end thereof and transversely extending cam butt means at the other terminal end thereof,

said body portion being selectively shaped intermediate said terminal ends to include,

an upper bifurcated segment defining a channel for guiding the path of displacement of said closing element relative to said hook means,

a lower slotted segment sized to accomodate the dependent end portion of said closing element and permit independent longitudinal and transverse displacement of said dependent end portion of said closing element relative thereto, and

an intermediate segment of reduced cross sectional extend sized to permit elastic flexure of the cam butt means containing terminal end relative to said bifurcated segment of said body portion.

4,696,171

LAUNDRY WASHING MACHINE

Piero Babuin, Pordenone, Italy, assignor to Zanussi Elettrodomestici SPA, Pordenone, Italy

Filed Nov. 20, 1985, Ser. No. 799,986

Claims priority, application Italy, Nov. 20, 1984, 45725 A/84

Int. Cl.[4] D06F *37/00*

U.S. Cl. 68—207 **21 Claims**

1. A washing machine comprising:

a wash tub having a basket therein;

a housing positioned below said wash tub and in fluid communication with said wash tub;

at least one heating element provided in said housing;

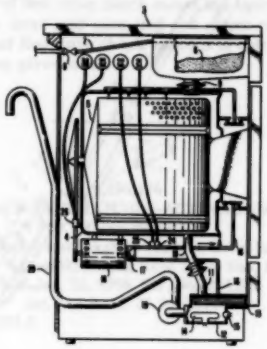
at least one thermostatic sensor provided in said housing, said at least one thermostatic sensor connected to said at least one heating element for controlling the temperature of washing liquid contained in said housing;

a recirculation conduit in fluid communication with said wash tub and said housing;

electric recirculation pump mea.ns in fluid communication with said recirculation conduit for recirculating washing liquid from said housing to said wash tub;

means for automatically controlling the filling level of washing liquid into said wash tub including an inlet hose for supplying washing liquid to said wash tub, an electric valve in fluid communication with said inlet hose for controlling the amount of washing liquid supplied to said wash tub, washing liquid level sensor means for controlling the level of washing liquid supplied to the wash tub, and electric circuit means connected to said electric valve and said washing liquid level sensor means for operating said electric valve in response to signals from said washing liquid level sensor means;

said washing liquid level sensor means including a first pressure switch operatively connected to said electric valve and said electric circuit means for causing the addition of washing liquid to said tub at a normal level regardless of the type or quantity of the load placed in said wash tub, a second pressure switch operatively connected to said electric valve and said electric circuit means for causing



the addition of washing liquid to said housing at a level above said at least one heating element and said at least one thermost,atic sensor, a third pressure switch operatively connected to said electric valve and said electric circuit means for causing the addition of washing liquid to said tub at a level which is dependent on the load placed in said tub but is lower than the level set by said first pressure switch, and a fourth pressure switch operatively connected to said electric valve and said electric circuit for causing the addition of washing liquid to said tub at a level higher than the washing liquid levels set by said first and third pressure switches.

4,696,172

ANTI-THEFT DEVICE FOR ROAD VEHICLES

Robert T. Farrow, 3638 Yorkingham Dr., Houston, Tex. 77066

Filed Sep. 4, 1985, Ser. No. 772,609

Int. Cl.[4] E05B *65/12*

U.S. Cl. 70—238 **9 Claims**

9. An anti-theft device for road vehicles comprising;

an elongated rod member having an upper end formed into an inverted generally U-shaped configuration to releasably engage a portion of the vehicle steering wheel and an externally threaded lower end for adjustable connection of said rod to an intermediate connector member,

an intermediate connector member having internal threads threadedly received on the threaded lower end of said elongated rod and movable thereon for placement at selective distances relative to the upper end of said rod member and having a flat tab projecting outwardly from one side at the bottom thereof said tab having at least one hole extending transversely therethrough for releasably connecting said intermediate connector member to a pedal block member,

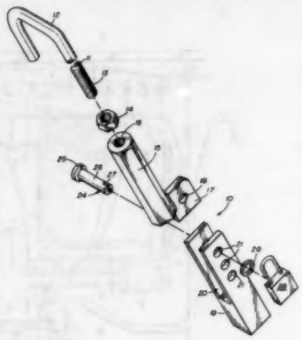
a lock nut threadedly received on the threaded lower end of said elongated rod for securing said intermediate connector member on said rod at a selective distance from the upper end of said rod member,

a yoke comprising a rectangular control block member

adapted to be removably received between a pedal and the vehicle floor board, said yoke having a vertical slot extending downwardly a distance from the top surface for receiving a portion of the pedal and a series of vertically spaced holes transverse to the slot extending through opposing side walls of the block member,

said slot adapted to receive the brake pedal and said intermediate member tab in vertical relation,

a lock pin having a head larger than said holes in said side walls and said tab, a shank smaller in diameter than said holes, a hole extending transversely through the shank near the outer end for receiving a lock, and



a washer received on the end of the shank between the side wall of said block member and said transverse hole,

said lock pin being received through said holes in said tab and said block member to connect said intermediate connector with said block member and retain said pedal within said slot and, said connection secured by the conventional lock member,

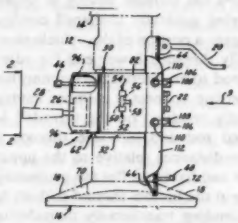
said anti-theft device in the locked position providing a mechanical interlock between the vehicle steering wheel and the brake pedal to prevent rotation of the steering wheel, and between the pedal and floorboard of the vehicle and said control pedal block member preventing the pedal from being depressed.

4,696,173

VEHICLE STEERING WHEEL AND SHIFT LEVER GUARD

James D. Lee, 22340 Natasha La., South Lyon, Mich. 48178-9713

Filed Mar. 14, 1986, Ser. No. 839,606
Int. Cl.[4] E05B *13/02, 17/14*
U.S. Cl. 70—427 **20 Claims**



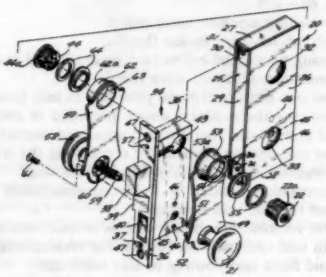
1. A protective guard for a steering wheel and a shift lever on a steering column with a housing between the steering wheel and shift lever and the housing having a projecting portion for enclosing a turn signal switch, the guard comprising, a metallic carrier member and a metallic arm member which can be assembled together to encircle the column housing in operative relationship therewith, said carrier member having a cavity constructed and arranged to receive at least part of the projecting switch portion of the housing when said members are assembled together in operative relationship with the column housing, said cavity having a first pair of wall portions generally circumferentially spaced apart and constructed and arranged to overlap with and lie adjacent wall portions of the projecting switch portion of the column housing and limit the extent to which said carrier member can be moved generally circumferentially with respect to the column housing when said members are assembled together in operative relationship with the column housing, and said cavity having a second pair of wall portions generally axially spaced apart and constructed and arranged to overlap and lie adjacent wall portions of the projecting switch portion of the column housing and limit the extent to which said carrier member can be moved generally axially with respect to the column housing when said members are assembled together in operative relationship with the column housing, said carrier member being generally U-shaped and having a pair of legs which are spaced apart and disposed generally on opposite sides of the column housing when said members are assembled together in operative relationship with said column housing, a hinge joint between one of said legs and said arm member which in assembly connects said one leg and arm member while permitting said arm to be pivoted so that said other leg and said arm can be releasably interlocked, said other leg and said arm being constructed and arranged such that they can be releasably locked together when said arm extends between said legs with said carrier and arm members together encircling the column housing when said members are assembled together in operative relationship with the column housing, a first stop carried by said arm member and constructed and arranged to underlie and be adjacent the shift lever to limit the extent to which the shift lever can be moved generally circumferentially in at least one direction with respect to the column when said members are assembled together in operative relationship with said column housing, at least one second stop carried by said arm and constructed and arranged to be lapped with a spoke of the steering wheel and to limit rotation of the steering wheel with respect to the column when bearing on the wheel when said members are assembled together in operative relationship with said column housing.

4,696,174

REVERSIBLE MORTISE LOCKSET

George R. Marks, 19 The Hemlocks, Roslyn Estates, N.Y. 11576

Filed Oct. 31, 1985, Ser. No. 793,140
Int. Cl.[4] E05B *9/08*
U.S. Cl. 70—451 **7 Claims**



1. In combination with a metal door furnished with a lock box having two opposed vertical walls, each wall of the lock box having two vertically aligned holes of equal diameter,

each hole being horizontally aligned with a similar hole in the other lock box wall,

a reversible mortise lockset comprising:

a mortise lock having an internally threaded lock cylinder hole about equal in diameter to each of the holes in the lock box wall, a door knob spindle hole, and a through bolt hole,

the mortise lock being insertable into the lock box in either of two orientations, in one of the orientations the lock cylinder hole being aligned with the upper hole in each lock box wall and the door knob spindle hole and through bolt hole being exposed through the lower hole in each lock box wall, and in the other of the orientations the lock cylinder hole being aligned with the lower hole in each lock box wall and the door knob spindle hole and through bolt hole being exposed through the upper hole in each lock box wall,

a pair of plates, one for mounting on the exterior surface of each of the lock box walls, each plate being adapted to accommodate a door knob and spindle near one of its ends so that the door knob projects outwardly from the plate and the door knob spindle projects inwardly therefrom for insertion into the door knob spindle hole in the mortise lock,

a single mounting means projecting inwardly from one of the plates for insertion into the through bolt hole in the mortise lock,

a cooperable mounting element for securing the other plate to the mounting means, the mounting means and mounting elements securing one end of each plate to the lock box and mortise lock,

a lock cylinder hole near the end of each plate opposite the end carrying the mounting means, the lock cylinder hole in the mortise lock plate registering with the lock cylinder hole in the mortise lock and with a hole in the lock box wall adjacent to the plate when the mounting means is located within its respective hole, and

an externally threaded lock cylinder passing through the lock cylinder hole in each plate and through the hole in the lock box wall in registry with the hole in the plate, and the lock cylinder being threaded into the lock cylinder hole in the mortise lock, so as to fasten the other end of each plate to the lock box and mortise lock,

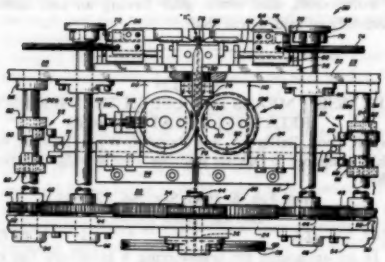
whereby the mortise lockset can be assembled with the lock box so that the door knobs are either above or below the lock cylinders depending upon which of the two orientations are chosen for insertion of the mortise lock into the lock box.

4,696,175

CLUTCH APPARATUS FOR SPRING MAKING MACHINE

Eugene M. Skupien, 66 S. Vista Ave., Addison, Ill. 60101

Filed Apr. 29, 1986, Ser. No. 857,243
Int. Cl.[4] B21F *3/02*
U.S. Cl. 72—135 **8 Claims**



1. A motor-driven wire forming machine having a housing supporting a plurality of forming slides for forming a wire into a selected shape, the improvement comprising:

a main drive gear driven by the motor and driving a planetary gearing means;

wire feed roll means operable to drivably feed the wire to the forming slides;

a plurality of feed drive clutch means for providing continuous driving of said wire feed roll means;

cam means driven by said planetary gearing means for driving said feed drive clutch means; and

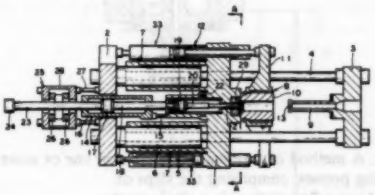
connector drive means interconnecting said feed drive clutch means with said wire feed roll means, said connector drive means selectively driven by at least one of said plurality of feed drive clutch means and operable to continuously drive said wire feed roll means regardless of which said feed drive clutch means is in a driving condition at any given time.

4,696,176

PULLBACK TYPE DOUBLE-ACTING INDIRECT EXTRUSION PRESS

Akira Asari, Osaka, and Takahisa Tabuchi, Kobe, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jan. 23, 1986, Ser. No. 824,582
Int. Cl.[4] B21C *23/21, 35/04*
U.S. Cl. 72—273.5 **3 Claims**



1. A pullback type indirect extrusion press, comprising:

a fixed platen having an opening formed therein for allowing for piercing of a billet;

first and second movable platens rigidly connected to each other, said first and second movable platens, respectively, being arranged in front of and behind said fixed platen;

means connected to said first movable platen and said fixed platen for producing an extruding force provided between said fixed platen and said first movable platen;

a container device connected to said fixed platen and a die stem connected to said second movable platen arranged between said fixed platen and said second movable platen;

a piercing cylinder mechanism mounted on said fixed platen and positioned between said fixed platen and said first movable platen, and provided independent of said means for producing an extruding force, wherein said piercing cylinder mechanism further comprises a mandrel extending through said opening and cooperating with a die hole of the die stem to determine a shape of a material to be extruded in an extruding direction;

a feed-liquid switching valve mechanism for reciprocatingly sliding the mandrel along the axis of the press; and

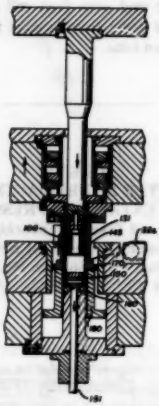
a mandrel stopper mechanism positioned on a side of said first movable platen opposite said piercing cylinder mechanism and having a gate member engageable and disengageable with an engaging portion of the piercing mechanism extending through an opening in said first movable platen.

4,696,177

METHOD AND APPARATUS FOR FORMING CONTAINERS

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed Dec. 31, 1986, Ser. No. 49
Int. Cl.[4] B21D *22/00*
U.S. Cl. 72—379 16 Claims



1. A method of forming a container in one or more double acting presses, comprising the steps of:

(A) at a first station, in a single stroke

(1) forming a blank of material;

(2) drawing an inverted flanged cup from said blank;

(3) reverse drawing said inverted cup to form a flanged cup; and

(4) removing said flanged cup to a second station; and

(B) at said second station, in a single stroke

(1) drawing said flanged cup into a second inverted cup;

(2) reverse redrawing said second inverted cup into a flanged container; and

(3) profiling the bottom of said flanged container at the bottom of the stroke.

7. Apparatus for forming flanged containers in one or more double acting presses from a sheet of material, comprising:

(A) at a first station

(1) a blank and draw punch;

(2) a fixed hollow die core ring;

(3) said blank and draw punch being movable toward said die core ring to form an inverted cup from the material over the top of said die core ring;

(4) a draw horn movable toward said die core ring to reverse draw said inverted cup within said die core ring to form a flanged cup;

(B) at a second station

(1) a hollow redraw sleeve;

(2) a first pressure sleeve movable toward said redraw sleeve to invert said flanged cup over the top of said redraw sleeve;

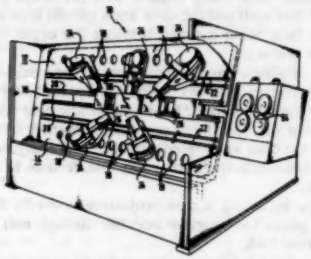
(3) a profile punch movable toward said redraw sleeve to reverse draw said inverted cup within said redraw sleeve.

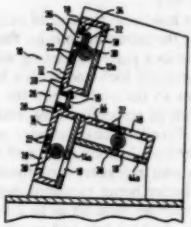
4,696,178

WIRE AND BAND PROCESSING MACHINE

Otto Bihler, Halblech, Fed. Rep. of Germany, and Eduard Brüller, Trimbach, Switzerland, assignors to Otto Bihler, Halblech, Fed. Rep. of Germany

Continuation of Ser. No. 736,525, May 21, 1985, abandoned, which is a continuation of Ser. No. 463,556, Feb. 3, 1983, abandoned. This application Aug. 11, 1986, Ser. No. 895,518
Claims priority, application Fed. Rep. of Germany, Feb. 16, 1982, 3205493
Int. Cl.[4] B21F *1/00*
U.S. Cl. 72—384 63 Claims





1. A wire and band processing machine comprising two processing plates disposed in spaced relation and forming a space therebetween, each of said processing plates having a plurality of holes extending therethrough from one side to the other, a drive system located within said space, said drive system including at least one worm shaft extending parallel to said processing plates, securing means on the sides of said processing plates remote from said space and arranged for mounting processing equipment thereon, at least selected ones of said holes receiving coupling means arranged for drivingly coupling processing equipment with said at least one worm shaft, said coupling means including a worm gear to mesh with said worm shaft, said worm gear having an axis extending transversely of said worm shaft.

4,696,179

AIR ASSIST MEANS FOR USE IN TRANSFERRING RELATIVELY FLAT OBJECTS

Steven T. Cook, Bellbrook, and David K. Wynn, Dayton, both of Ohio, assignors to Dayton Reliable Tool & Mfg. Co., Dayton, Ohio

Filed Feb. 6, 1986, Ser. No. 826,635
Int. Cl.[4] B21J *13/08*
U.S. Cl. 72—405 19 Claims

1. In an apparatus for transferring a relatively flat object from a first station to a destination, including

means for supporting and operating on the object at the first station;

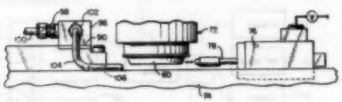
said supporting means supporting the object from an upper surface thereof;

means defining an at least partially enclosed transfer path extending from an entrance adjacent said first station toward said destination; and

means for propelling the object from said supporting means in edgewise fashion into said transfer path, wherein said propelling means directs the object into said path in substantially free flight;

the improvement comprising air assist means for acting upon the object moving into and along said path, said assist means including:

means for supplying air under pressure;



an outlet conduit connected to said supply means and defining an open outlet end;

valve menas disposed along said outlet conduit for contolling flow of air along said conduit; and

control means connected to said valve means for selectively controlling said valve means in response to operation of said first station so that said valve means is actuated to supply air to the transfer path just after each flat object has entered the enclosed transfer path;

said outlet conduit being disposed with said outlet end at said entrance to said transfer path, and with said end positioned in a direction into said path whereby air is directed along said path in the direction of movement of the object.

4,696,180

GUIDING ARRANGEMENT FOR FORGING PRESS COLUMNS ASSEMBLED OF FLAT TIE-ROD LAYERS

Adam Zandel, Forest Hills, N.Y., assignor to Press Technology Corporation, White Plains, N.Y.

Filed Feb. 26, 1986, Ser. No. 833,043

Int. Cl.[4] B21D *37/00*; **B21J** *13/04*

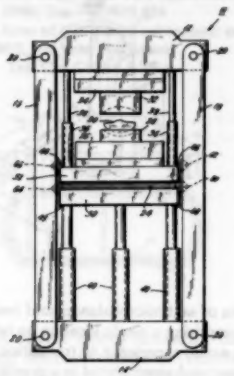
U.S. Cl. 72—456 **12 Claims**

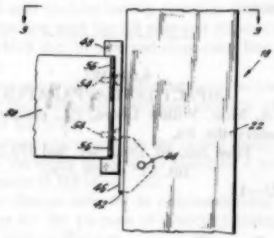
1. A forging press, comprising:

(a) a generally rectangular frame including: a load-opposing upper and generally horizontally extending crosshead assembly comprised of a plurality of overlapping plates and a lower crosshead assembly spaced from, parallel to, and generally coextensive with said upper crosshead assembly; and left and right vertically extending columns extending between said upper and lower crosshead assemblies for completing said frame, each column comprising a plurality of spaced tie-rod plates having end regions, said end regions being interlaced with corresponding end regions of said crosshead assemblies, and pins passing through said end regions to connect said columns and said crosshead assemblies to one another;

(b) forging press components including: a bridge extending through said frame; a lower platen on said bridge facing said upper crosshead assembly and an upper platen mounted to said upper crosshead assembly, means for moving at least one of said lower and upper platens to render said platens movable toward and away from each other, at least portions of said forging press components and said frame being movable vertically relatively to one another durng forging cycles of said forging press; and

(c) a flexible guiding arrangement at least partially disposed between said forging press components and said columns of said frame for guiding and keeping said forging press aligned during said forging cycles, said guiding arrangement including a plurality of sliding plates, each of said sliding plates being mounted to those of said forging press components facing one or the other of said columns of said frame and which are movable relative to said columns of said frame, and a plurality of metal segments interposed between said tie-rod plates of said columns and pivotably mounted thereto in a manner which enables said metal segments to pivot in generally vertically oriented planes; each of said metal segments pivoting independently of all other ones of said metal segments whereby the degree of





pivoting of each one of said metal segment is inherently adjusted to optimize stress distribution in the transverse direction across said tie-rod plates; said segments protruding from said tie-rod plates sufficiently to slidingly abut against a respective one of said sliding plates, said sliding plates and said metal segments being sized to slide over each other during the entirety of each of said forging press cycles of said forging press.

4,696,181

DECOUPLING SUSPENSION SYSTEM FOR AN OSCILLATING ELEMENT MICROBALANCE

Georg Rupprecht, Voorheesville, and David R. Hassel, Troy, both of N.Y., assignors to Rupprecht & Patashnick Co., Inc., Albany, N.Y.

Filed Apr. 10, 1986, Ser. No. 850,290

Int. Cl.[4] G01G *3/16, 21/23*

U.S. Cl. 73—580 **18 Claims**

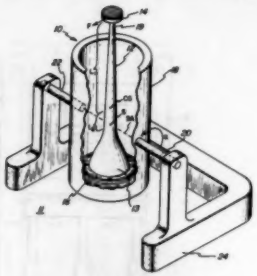
1. Mass measuring apparatus comprising:

a microbalance having an elongate elastic element which can be excited to oscillate at a resonant frequency, said element having a longitudinal axis, one end of said element being available to support a specimen to be measured and being free to oscillate, the other end of said element being anchored to the base of a housing, the housing at least partially enclosing said element, the mass of said specimen

being measured by monitoring changes in the resonant frequency of the oscillating element;

a support member; and

suspension means connected to and between said support member and housing for suspending said microbalance from said support member, said suspension means extending along a first axis which intersects an instant center of



rotation of said microbalance, said instant center of rotation comprising a single location on said longitudinal axis which would experience no translation were the microbalance operated unsupported in a gravity free environment, whereby vibration losses from the oscillating element and external mechanical perturbations to the microbalance are minimized.

4,696,182

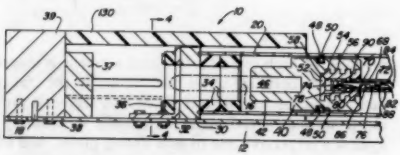
IMPACT TEST APPARATUS

Avraham A. Meir, Willow Grove, Pa., assignor to Seti Inc., Montgomeryville, Pa.

Filed Jun. 10, 1986, Ser. No. 872,720

Int. Cl.[4] G01N *3/30*

U.S. Cl. 73—12 **16 Claims**



1. An impact test apparatus comprising:

a barrel adapted to contain pressurized gas and having a sealed end and an opposed open end;

a shuttle positioned for translation within the barrel, the shuttle including means for releasably carrying a test sample and sealing means for sealingly engaging the barrel, the sealing means dividing the interior of the barrel into a portion open to the atmosphere and a sealed portion;

means for supplying pressurized gas to the sealed portion of the interior of the barrel;

trigger means for selectively retaining the shuttle in a fixed position in the barrel and for releasing the shuttle to permit the shuttle to accelerate toward the open end of the barrel as the pressurized gas in the sealed portion of the barrel expands; and

stopping means proximate the open end of the barrel to decelerate the shuttle and retain the shuttle substantially within the barrel while allowing the test sample to travel toward a target aligned with the open end of the barrel.

4,696,183

METHOD AND APPARATUS OF FLOW ANALYSIS

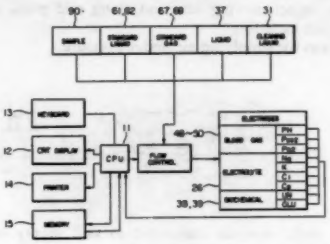
Hiroshi Mitsumaki; Naoya Ono; Isao Shindo, and Nobuyoshi Takano, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 28, 1986, Ser. No. 834,806

Claims priority, application Japan, Mar. 1, 1985, 60-40911

Int. Cl.[4] G01N *33/49, 27/46, 27/56*

U.S. Cl. 73—19 **14 Claims**



1. An apparatus of flow analysis comprising:

a common flow path having a sample introducing nozzle;

a plurality of branch flow paths each connected to said common flow path;

means for detecting a flow path blockage, said means being disposed in a first branch flow path;

means for removing the blockage by cleaning said common flow path when said flow path blockage is detected by said flow path blockage detecting means;

a measuring electrode disposed in a second branch flow path, said measuring electrode being apt to be affected by a pressure change in the flow path; and

means for introducing a sample into said second branch flow path after the blockage in said common flow path is removed.

4,696,184

DEVICE FOR MEASURING THE ABSOLUTE VALUE OF THE DENSITY OF SALTS IN ATMOSPHERE

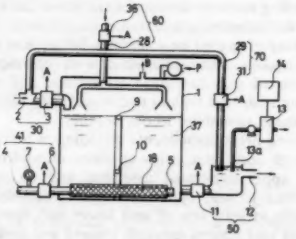
Takaaki Fukumoto, Kishiwada, and Toshiaki Ohmori, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1985, Ser. No. 790,932

Claims priority, application Japan, Dec. 20, 1984, 59-270269

Int. Cl.[4] G01N *27/00*

U.S. Cl. 73—32 R **16 Claims**



1. A measuring device for measuring the absolute value of the density of salts in an atmosphere, which comprises:

a substantially airtight water tank containing super pure water of a predetermined quantity;

a supplying means operatively associated with said water tank for supplying super pure water to said water tank;

a bubbling means disposed in said water tank for bubbling a

predetermined quantity of atmosphere into said super pure water contained in said water tank;

an exhausting means operatively associated with said water tank for exhausting said super pure water from said water tank;

a sodium ion analyzer means operatively associated with said exhaust means for measuring the density of sodium ions in said super pure water after said super pure water is exhausted from said exhaust means; and

an introduction means operatively associated with said water tank and said bubbling means for introducing said atmosphere to said bubbling means based upon the pressure differences between the inside of said water tank and said atmosphere.

4,696,185

METHOD AND APPARATUS FOR CONTROLLING THE DYE RECEPTIVITY OF TEXTILES

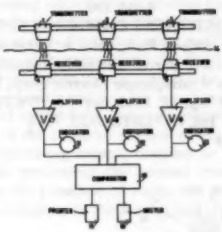
Hellmut Beckstein, Bad Abbach, Fed. Rep. of Germany, assignor to Mahlo GmbH +Co. KG., Donau, Fed. Rep. of Germany

Filed Apr. 25, 1984, Ser. No. 603,605

Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316171

Int. Cl.⁴ G01N *33/36*

U.S. Cl. 73—37.7 **8 Claims**



1. A method for preparing a record of the dye receptivity characteristics of an undyed web of textile for the subsequent use by a dyer when dyeing said web, comprising the following steps:

(a) running said undyed web of textile through a measuring station including mechanical energy transmitter means and mechanical energy receiver means,

(b) applying mechanical energy to said undyed web of textile by said transmitter means,

(c) measuring mechanical energy passed through or reflected by said undyed web,

(b) comparing the applied mechanical energy with the measured mechanical energy for determining said dye receptivity of said undyed web of textile,

(d) comparing mechanical energies measured at different locations in said undyed web of textile with each other for determining non-uniformities in said dye receptivity, and

(f) recording said non-uniformities in said dye receptivity to form said record for said subsequent use by the dyer for dyeing said undyed web of textile.

4,696,186

STORAGE TANKS HAVING SECONDARY CONTAINMENT MEANS

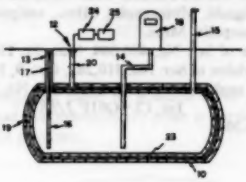
Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229

Division of Ser. No. 740,869, Jun. 3, 1985, Pat. No. 4,607,522, which is a continuation-in-part of Ser. No. 544,013, Oct. 21, 1983, Pat. No. 4,523,454, and Ser. No. 580,800, Feb. 16, 1984, Pat. No. 4,524,609, which is a continuation-in-part of Ser. No. 544,012, Oct. 21, 1983, abandoned. This application Aug. 22, 1986, Ser. No. 899,484

The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.

Int. Cl.⁴ G01M *3/32*

U.S. Cl. 73—49.2 **14 Claims**



1. A storage tank system having secondary containment capability and leakage detection capability, comprising:

(a) an outer tank shell having rigid walls fitted with a fill pipe and a dispensing line;

(b) a bladder adapted for fitting within the outer tank shell to hold liquid, said bladder having openings with means for sealed connection with the fill pipe and dispensing line or points at which the fill pipe and dispensing line enter the outer shell;

(c) gas pervious material positioned between the bladder and the wall of the outer tank shell and securely adhered to said bladder and wall;

(d) means in communication with the closed space occupied by the gas pervious material to maintain a non-atmospheric pressure in the space; and

(e) a pressure change detector in communication with the closed space for the purpose of detecting leakage of the outer tank shell or bladder.

4,696,187

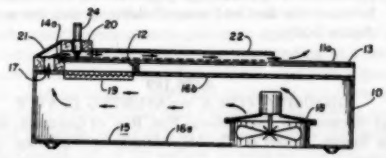
CHROMATOGRAPHY METHOD

Reiner H. Kopp, Copake, and Allen I. Panetz, Huntington, both of N.Y., assignors to Biochemical Diagnostics, Inc., Farmingdale, N.Y.

Division of Ser. No. 410,490, Aug. 23, 1982, which is a continuation of Ser. No. 232,134, Feb. 6, 1981, Pat. No. 4,351,800. This application Jan. 30, 1985, Ser. No. 696,399

Int. Cl.⁴ G01N *31/08*

U.S. Cl. 73—61.1 C **2 Claims**



1. In a method of eluting and spotting for identifying unknown substances by chromatography beginning with a column in which the packing medium has the unknown substance entrained therein, the steps of

placing the spotting applicator on the chromatography plate in contact therewith to establish a point of spotting;

establishing a continuous flow path from the column to the chromatography plate;

placing an eluting solvent into the column above the packing medium;

metering the flow directly to the plate while causing air to blow over the plate at the point of spotting, thereby to establish a continuous solvent flow from the column above the packing media through the applicator to the plate and controlling the spot size and concentrating the unknown substance by the evaporation due to the flow of air.

4,696,188

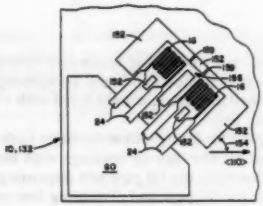
SEMICONDUCTOR DEVICE MICROSTRUCTURE

Robert E. Higashi, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 480,644, Mar. 31, 1983, abandoned, which is a division of Ser. No. 310,262, Oct. 9, 1981, abandoned. This application Sep. 6, 1985, Ser. No. 773,106

Int. Cl.[4] G01F *1/68*

U.S. Cl. 73—204 **93 Claims**



1. An integrated semiconductor device comprising:

a semiconductor body having a depression formed by an anisotropic etch applied to a first surface of the body, the semiconductor body comprising (100) silicon having a (100) plane and a <110> direction, the first surface of the semiconductor body being substantially parallel to the (100) plane;

a thin film dielectric member comprising first and second static electric elements, the member having a predetermined configuration suspended over the depression, the predetermined configuration being oriented at a non-zero angle to the <110> direction, the member being connected to the first surface at first and second substantially opposing ends so that the predetermined configuration is bridged across the depression, the depression opening to the first surface around at least a portion of the predetermined configuration, the depression, the opening, and the member providing substantial physical and thermal isolation between the first and second elements and the semiconductor body;

whereby an integrated semiconductor device provides an environment of substantial physical and thermal isolation between the first and second elements and the semiconductor body.

4,696,189

HOUSING FOR A MEASURING DEVICE

Karl Hochreuther, Nuremberg, Fed. Rep. of Germany, assignor to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany

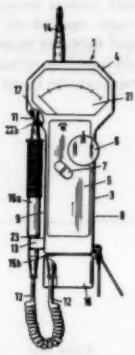
Filed Apr. 10, 1986, Ser. No. 850,265

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1985, 3513345

Int. Cl.[4] G01D *11/24;* **G01R** *1/04*

U.S. Cl. 73—431 **12 Claims**

1. Measuring device housing, comprising two mutually assembled housing shells having mutually engaged dust protection edges, a trowel shape with a relatively narrow handle-type holder part changing into a relatively wide plate-type indicator part, an operating surface having mutually opposite finger and thumb sides, a switching wheel operating element mounted on said operating surface and extending beyond said thumb side thereof, another operating element disposed on said operating surface laterally of said switching wheel, said operating elements being disposed within the swinging range of a



thumb of the right hand of an operator of the measuring device gripping said holder part from behind for actuating said operating elements, a measuring probe having a free end disposed in a recess formed in a portion of said indicator part protruding over said holder part and another end, a mounting fork detachably fastening said other end of said measuring probe to said housing shells, and a connecting cable connecting between said other end of said measuring probe and said housing shells.

4,696,190

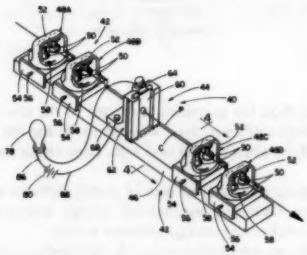
TUBE STRAIGHTNESS CHECKING APPARATUS

George D. Bucher, Allison Park; John A. Catanese, Seward, and William D. Clawson, Burrell Township, Indiana County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 12, 1985, Ser. No. 775,210

Int. Cl.[4] G01B *5/20, 7/28*

U.S. Cl. 73—865.8 **13 Claims**



1. A tube straightness checking apparatus, comprising:

(a) means for receiving and guiding a tube along a generally linear path; and

(b) a gauging mechanism disposed along said linear path and being operable to check the straightness of the tube as it is moved along said path past said mechanism by detecting deviation greater than a predetermined amount of the tube from an imaginary centerline which is generally coincident with said linear path;

(c) said gauging mechanism including a gauge plate with a circular gauging orifice defined therein through which the

tube passes as it is moved along said linear path, said gauging orifice having a center aligned coincident with said imaginary centerline of the tube and being of a predetermined diametric size which establishes the out-of-straightness tolerance for the tube;

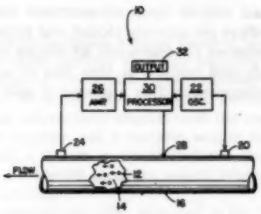
(d) said gauging mechanism also including a holder member releasably mounting said gauge plate across said linear path whereby said gauge plate can be interchanged with other plates having circular orifices of different diametric sizes for checking the straightness of tubes of different diameter sizes.

4,696,191

APPARATUS AND METHOD FOR VOID/PARTICULATE DETECTION

Thomas N. Claytor, Woodridge, Ill.; Carl E. Ockert, Vienna, Va., and Richard Randall, Canoga Park, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 24, 1986, Ser. No. 877,959
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—600 **23 Claims**



1. Apparatus for detecting voids and particulates in a fluid within a containing means, the apparatus comprising:

(a) first transducer means, coupled to a first location on the containing means, for transmitting a diffuse sound field of predetermined frequency into the fluid;

(b) second transducer means, coupled to a second location on the containing means, for receiving a portion of the transmitted sound field and for generating a signal representative of the received portion of the sound field; and

(c) signal processing means, coupled to the second transducer, for processing the second transducer signal to determine the presence of voids and particulates responsive to attenuation of the sound field transmitted through fluid.

4,696,192

FLUID PRESSURE SENSOR

Ichiro Yamashita, Hirakata; Masayuki Wakamiya, Suita; Hiroyuki Hase, Katano, and Shinya Tokuono, Ashiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 7, 1986, Ser. No. 882,535
Claims priority, application Japan, Jul. 4, 1985, 60-147526
Int. Cl.[4] G01L *7/08, 9/16*
U.S. Cl. 73—728 **9 Claims**

1. A fluid pressure sensor comprising;

a body made of a soft magnetic material with a groove formed therein;

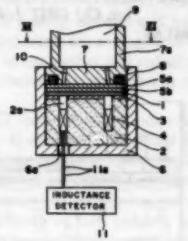
a coil installed in said body in said groove;

at least one magnetostrictive plate placed on said body over said groove;

at least one non-magnetic plate placed over said magnetostrictive plate;

a casing for accommodating said body carrying said coil, said magnetostrictive plate, and said non-magnetic plate; and

a lid member for closing said casing, said lid member having a surface for receiving a fluid pressure and at least one through hole formed in said lid member within said fluid pressure receiving surface, said through hole extending to



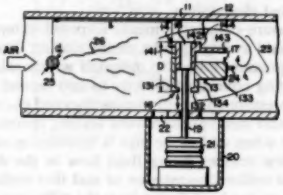
said non-magnetic plate at position over said groove, whereby said magnetostrictive plate is partially distorted by said fluid pressure.

4,696,193

AIRFLOW RATE MEASURING APPARATUS OF KARMAN VORTEX TYPE

Sinzi Nanba, Kariya; Kazuma Matsui, Toyohashi; Toru Mizuno, Aichi, and Tukasa Goto, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 5, 1985, Ser. No. 804,848
Claims priority, application Japan, Dec. 5, 1984, 59-256829
Int. Cl.[4] G01F *1/32*
U.S. Cl. 73—861.22 **14 Claims**



1. An airflow rate measuring apparatus of Karman vortex type, comprising:

a vortex generator which is arranged in an airflow designated for measurement and generates vortexes of a frequency corresponding to an airflow rate at a downstream side thereof;

vortex detecting means, arranged at a downstream side of said vortex generator, for generating an electrical signal corresponding to the frequency of vortexes;

a turbulence generator arranged at an upstream side of said vortex generator at a location corresponding to a central part of the airflow which flows against said vortex generator, said turbulence generator including a rod member having a width smaller than a surface of said vortex generator which faces the airflow so as to decrease the speed of the central part of the airflow flowing against said vortex generator,

said vortex generator comprising a columnar member which extends across the airflow and a ratio d/D being about 0.38, where d is a diameter of said rod member and D is the typical dimension along the widthwise direction of the surface of said vortex generator against which air flows, said rod member being parallel to the axis of said vortex generator.

4,696,194

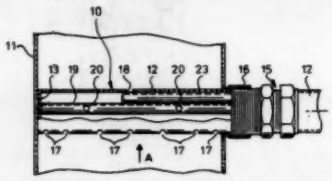
FLUID FLOW MEASUREMENT

James C. Taylor, Colchester, England, assignor to Taurus Controls Limited, Colchester, England

Filed Feb. 20, 1986, Ser. No. 831,938

Int. Cl.[4] G01F *1/46*

U.S. Cl. 73—861.66 **10 Claims**



1. A sensing probe for use in determining fluid flow rates along a duct, which sensing probe comprises:

a probe pipe adapted for mounting within said duct so as to extend thereacross with one end of said pipe closed and the other end of said pipe communicating with the exterior of said duct;

a plurality of first orifices extending through the wall of said probe pipe and arranged along a length of said pipe;

at least one second orifice extending through the wall of said pipe at a position spaced by at least 90° of arc from said first orifices;

averaging tube means comprising a single tube mounted within and extending along said pipe and having at least two spaced-apart openings giving communication between the interior of said pipe and the interior of said tube means, each opening consisting of a bore extending wholly across said single tube and the openings being positioned to each side of the duct axis when the probe is mounted therewithin;

first pressure connector means disposed externally of said duct, said averaging tube means lending thereto;

a static pressure tube also mounted within said probe pipe and being connected directly to said second orifice; and

second pressure connector means disposed externally of said duct, said static pressure tube leading thereto;

whereby when said probe pipe is mounted in said duct with said first orifices facing fluid flow in the duct and said second orifice downstream of said first orifices, the fluid flow rate can be deduced from the difference between the averaged total pressure appearing at said first pressure connector means and the pressure appearing at said second pressure connector means.

4,696,195

VALVE DEVICE

Jukka Savonlahti; Pertti Ekholm, both of Helsinki, and Hannu Harjunmaa, Espoo, all of Finland, assignors to Labsystems Oy, Finland

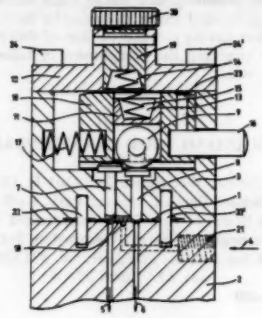
Filed Feb. 28, 1985, Ser. No. 706,507

Claims priority, application Finland, Mar. 2, 1984, 840846

Int. Cl.[4] G01N *1/10*

U.S. Cl. 73—864.84 **11 Claims**

1. A valve device suitable for transferring small and precise quantities of fluid comprising: a valve body defining a valve surface with a plurality of valve orifices within a valve area; a support body coupled to said valve body defining a support surface in facing relationship with said valve surface said support surface having a recess opposite said valve area; a resilient membrane secured between said support surface and said valve surface along a region encircling said orifices, said membrane being positioned, configured and dimensioned to yield so as to allow fluid transfer between said orifices in response to a pressure differential across said membrane; a pair of male closure members corresponding to at least two of said plurality of orifices slidingly mounted on means for supporting said closure members, each of said closure members being positioned facing and in alignment with said orifices on the opposite side of said membrane from said orifices and having an end configured to urge said membrane into contact with the respective peripheral edges of said orifices upon advancement theretoward, whereby said orifices are securely closed; and means coupled to said closure member for selectively advancing said closure members towards said orifices, at least two of said orifices being directly interconnected by a groove in said valve surface.



4,696,196

STABILIZED PLATFORM ARRANGEMENT

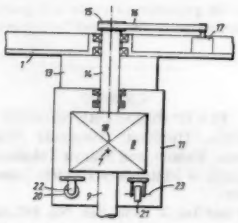
Svet O. Vucevic, Chelmsford, England, assignor to Marconi International Marine Company Limited, Stanmore, England

Filed May 2, 1986, Ser. No. 858,717

Claims priority, application United Kingdom, May 28, 1985, 8513372

Int. Cl.[4] H01Q *1/18*

U.S. Cl. 74—5.22 **4 Claims**



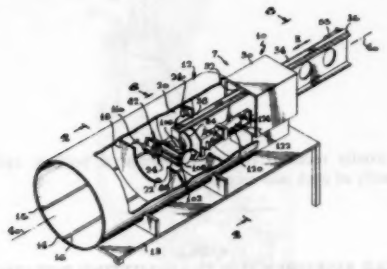
1. A stablished platform arrangement including a platform mounted on a support by means of a universal joint; a gyroscopic assembly including a pair of gyroscopic rotors each of which is mounted for rotation about respective axes which are mutually non-parallel, the assembly being linked to the platform so that the assembly and the platform together constitute a pendulous structure having a centre of gravity below the axes of the universal joint; and gearing means for coupling azimuth rotation of the gyroscopic assembly to that of the platform, the gear ratio of said gearing means being such that a given angular movement of the platform in azimuth causes a lesser corresponding angular movement of the gyroscopic assembly.

4,696,197

SYSTEM FOR COUNTERBALANCING TOOL MOUNT LOADS IN A MACHINE TOOL

Clifford L. Hannel, Los Angeles, Calif., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Apr. 11, 1986, Ser. No. 851,041
Int. Cl.[4] F16H 25/24; B23B 39/14; G05G 11/00
U.S. Cl. 74—89.15 7 Claims



1. In a machine including a frame member having a longitudinal axis, a beam member rotatably mounted to the frame member extending substantially perpendicularly outward in one direction from the axis of rotation thereof, the axis of rotation being substantially aligned with the longitudinal axis of the frame member, and a variable weight mounted to the beam member, a system to counterbalance the static torque produced by the weight about the axis of rotation of the beam member comprising:

a support member rotatably mounted to the frame member and coupled to the beam member for simultaneous rotation about the axis of rotation, said support member extending substantially perpendicularly outward in the opposite direction from the axis of rotation;

a pressurizable power actuator having a first end pivotally mounted to the frame member moveable in a horizontal plane and a second end having an output shaft for producing an output force proportional to the pressure level within the actuator;

coupling means connecting said output shaft to said support member; and

pressure level control means for maintaining said pressure level within said actuator at a value to produce a torque sufficient to counterbalance the torque produced by the weight.

4,696,198

POWER ASSIST DEVICE FOR AUTOMOTIVE STEERING SYSTEM

Shinichi Komatsu, Hatano, Japan, assignor to Atsugi Motor Parts Company, Limited, Kanagawa, Japan

Filed Sep. 30, 1985, Ser. No. 782,135
Claims priority, application Japan, Oct. 22, 1984, 59-221544
Int. Cl.[4] F15B 9/10
U.S. Cl. 74—388 PS 11 Claims

1. An automotive steering system having an unbalanced cylinder and a fluid control valve disposed in a hydraulic circuit connecting said cylinder to a fluid pressure source and to a fluid reservoir for controlling supply and drain of working fluid to said cylinder, comprising:

said unbalanced cylinder having:

an enclosed hollow cylinder;

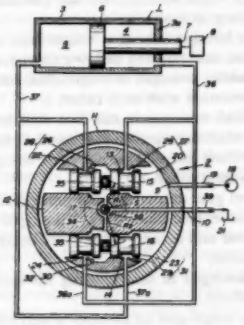
a piston disposed within the internal space of said cylinder so as to divide same into first and second working chambers; and

a piston rod connected to said piston at one end and connected at the other end to a steering member which actuates re-alignment of vehicular wheels for steering, said piston rod extending through said first chamber and exiting said cylinder for connection to said steering member at said other end; said fluid control valve having:

a valve housing connected to a manually operable steering stub shaft by means of a yielding structural member;

a first and a second bore passing through said valve housing, which first and second bores are arranged substantially in parallel relationship to each other and radially oriented at different positions relative to a rotation axis of said steering stub shaft;

a first and second spool valve disposed reciprocably within said first and second bore respectively, said first and second spool valves being connected to said steering stub shaft so as to be driven reciprocably in response to relative displacement between said valve housing and said steering stub shaft due to yielding of said yielding member, and said first and second spool valves having identical structures, and said first and second spool valves are so associated with said first and second bores as to differentiate magnitude of shifting relative to said first and second bores from each other;



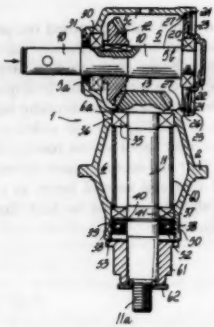
first and second means defining a first supply orifice and a first drain orifice between said first spool valve and the inner periphery of said first bore, the flow cross-section of said first supply orifice varying with the position of the first spool valve for control of the supply of working fluid to said first working chamber in said cylinder, and the flow cross-section of said first drain orifice varying with the position of said first spool valve for control of drainage of working fluid from said second working chamber, and a second supply orifice and a second drain orifice between said second spool valve and the inner periphery of said second bore, the flow cross-section of said second supply orifice varying with the position of said second spool valve for control of the working fluid supply to said second working chamber of said cylinder, and the flow cross-section of said second drain orifice varying with the position of said second spool valve for control of drainage of working fluid from said first chamber of said cylinder, and said flow cross-section of said first supply orifice and said first drain orifice being greater than that of the corresponding second supply orifice and second drain orifice.

4,696,199

ANGLE DRIVE TRANSMISSION UNIT PARTICULARLY FOR AGRICULTURAL MACHINERY

Fabrizio Fabbri, Modena, Italy, assignor to COMER S.p.A., Villanova Di Reggiolo, Italy

Filed Dec. 23, 1985, Ser. No. 812,022
Claims priority, application Italy, Jan. 8, 1985, 20421/85[U]
Int. Cl.[4] F16H *1/14, 57/02*
U.S. Cl. 74—417 8 Claims



1. An angle drive transmission unit particularly for agricultural machinery, comprising:

a box like housing having a longitudinal and a widthwise extension, said housing defining therein a first and a second chamber arranged in longitudinal succession to and in communication with each other,

an input shaft arranged in said first chamber,

an output shaft arranged in said second chamber,

said input shaft and said output shaft being arranged transverse to each other,

a first bevel gear carried by said input shaft,

a second bevel gear carried by said output shaft,

said first and said second bevel gears being in mutual mesh engagement,

bearings arranged in said housing for said input and said output shafts,

at least one removable lid member in said housing for closing one of said chambers, said lid member having seat formations for accommodating therein one of said bearings,

an elastically deformable retainer member for detachably affixing said removable lid member to said housing.

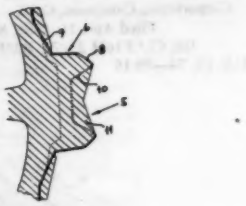
4,696,200

COMPOSITE GEARWHEEL STRUCTURE FOR THE CONTROL OF GRIPPER-CARRYING STRAPS IN WEAVING LOOMS

Luigi Pezzoli, Leffe, Italy, assignor to Vamatex S.p.A., Villa Di Serio, Italy

Filed Oct. 23, 1985, Ser. No. 790,483
Claims priority, application Italy, Oct. 26, 1984, 23626/84[U]
Int. Cl.[4] F16H *3/22*
U.S. Cl. 74—434 2 Claims

1. Composite gearwheel having a plastic, circular gearwheel body comprising a peripheral portion having a plurality of radially outwardly projecting gear teeth disposed at regular intervals on said peripheral portion, each said tooth defining at least one summit and each two adjacent said teeth defining a recess therebetween; and a continuous metal strip disposed on and coextensive with said peripheral portion, said metal strip covering each said summit of said plurality of plastic gear teeth, said metal strip being embedded in and encased by said plastic peripheral portion radially inwardly of each said recess, said peripheral portion and said teeth having a same and constant thickness; said strip having a width substantially equal to and coextensive with said constant thickness at each said summit; said strip having a width less than said constant thickness



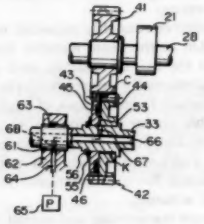
and axially recessed from said peripheral portion, radially inwardly of each said recess.

4,696,201

GEAR ASSEMBLY FOR TRANSMITTING ROTATION BETWEEN TWO SHAFTS

Kyo Hattori; Kazuo Kato, and Shuji Morita, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Oct. 29, 1985, Ser. No. 793,269
Claims priority, application Japan, Jan. 26, 1985, 60-8653[U]
Int. Cl.[4] F16H *57/04*
U.S. Cl. 74—467 7 Claims



1. A gear assembly for transmitting rotation between two camshafts which have cams for opening or closing intake or exhaust valves of a double overhead camshaft engine, comprising;

a first gear fitted to one of said camshafts,

a second gear fitted to the other of said camshafts, teeth of said second gear meshing with teeth of said first gear, said second gear being divided into two gear elements by a plane perpendicular to the axis thereof, said second gear further including a spring urging said two gear elements in opposite circumferential directions so that a tooth of one of said two gear elements and a tooth of another of said two gear elements hold a tooth of said first gear so that backlash between said first and second gears is eliminated,

means for pressurizing lubricating oil including a pressurized lubricant supply source, and

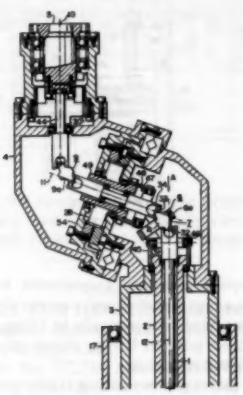
means for lubricating a meshing portion at which teeth of said first and second gears are mated to each other, said lubricating means having a passage formed between said two gear elements including a clearance between the teeth of said two gear elements of said second gear, said clearance extending from a bottom land to a crest of the teeth, said pressurized lubricant supply source supplying pressurized lubricating oil to said passage so that lubricating oil flows to the entire surface of said teeth in said meshing portion, said spring being located within said passage.

4,696,202

WRIST MECHANISM FOR INDUSTRIAL ROBOT

Tatenori Jinriki, Funabashi, and Fusaaki Kozawa, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 29, 1986, Ser. No. 857,103
Claims priority, application Japan, Apr. 30, 1985, 60-90805
Int. Cl.[4] B66C 1/10
U.S. Cl. 74—479 11 Claims



1. A wrist mechanism for an industrial robot, having a movable arm including:

a first wrist member disposed rotatably on the robot arm;

a second wrist member disposed rotatably on said first wrist member;

a drive shaft rotatably mounted on the rotational center line of said first wrist member;

universal joint means coupling said drive shaft for rotating the second wrist member;

means mounting said second wrist member relative to said first wrist member so that the rotational center lines of both said wrist members adjustably intersect each other at an angle of 90 degrees or less; and

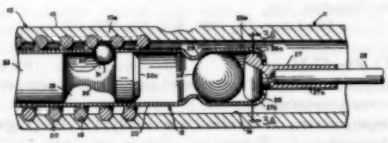
said universal joint means being constituted by first universal joint elements which include as their input shaft said drive shaft for rotating said second wrist member and an intermediate shaft as an output shaft, and by second universal joint elements which include as their input shaft said intermediate shaft and, as their output shaft, said second wrist member.

4,696,203

PUSH-PULL VERNIER CONTROL AND METHOD OF MANUFACTURE THEREOF

Ted W. Gregory, Libertyville, Ill., assignor to Arens Controls, Inc., Evanston, Ill.

Filed Sep. 10, 1984, Ser. No. 648,532
Int. Cl.[4] F16C 1/10
U.S. Cl. 74—501 R 10 Claims



1. A control assembly comprising an elongated sleeve having a threaded bore; a plunger assembly including a thin-walled cylindrical plunger tube slidably and rotatably received within said bore; said plunger tube having proximal and distal ends; a control wire equipped at one end wih a swivel connector having an enlarged head portion rotatably received within the distal end of said plunger tube; an entirely spherical ball mounted within said plunger tube proximal to said head and providing a spherical surface engagable with said head for low resistance to independent relative rotation of said connector and plunger tube under compression loads; said plunger tube curving inwardly and distally about said head to provide an annular flange having a smooth annular bearing surface engagable with said head for low resistance to relative rotation of said connector and plunger tube under tension loads; said head being circular in transverse section and having rounded peripheral bearing surfaces when viewed in longitudinal section.

6. A control assembly comprising an elongated sleeve having a threaded bore; a plunger assembly including a thin-walled cylindrical plunger tube slidably and rotatably received within said bore; said plunger tube having proximal and distal ends; a control wire equipped at one end with a swivel connector having an enlarged head portion rotatably received within the distal end of said plunger tube; a ball mounted within said plunger tube proximal to said head and providing a spherical surface engagable with said head for low resistancee to independent relative rotation of said connector and plunger tube under compression loads; said plunger tube curving inwardly and distally about said head to provide an annular flange having a smooth annular bearing surface engagable with said head for low resistance to relative rotation of said connector and plunger tube under tension loads; said plunger tube having a perforated non-circular opening in the wall thereof; a spherical member disposed within said tube having diameter smaller than said opening when measured in a first direction but larger than said opening when measured in a second direction; said spherical member being movable radially between an inwardly-displaced inoperative position and an outwardly-displaced operative position in which said member projects outwardly through said opening and is engagable with the the threads of said bore; and means for selectively shifting said member in radial directions within said tube.

7. A control assembly comprising an elongated sleeve having a threaded bore; a plunger assembly including a thin-walled cylindrical plunger tube formed of flexible material and slidably and rotatably received within said bore; said plunger tube having a perforated oval opening in the wall thereof; a spherical member disposed within said tube having a diameter smaller than the dimension of said oval opening measured along its major axis but larger than the dimension of said opening measured along its minor axis; said spherical member being movable radially between an inwardly-displaced inoperative position and an outwardly-displaced operative position in which said member projects outwardly through said oval opening and is engagable with the threads of said bore; and means for selectively shifting said member in radial directions within said tube.

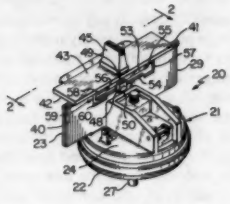
10. A control assembly comprising an elongated sleeve having a threaded bore; a plunger assembly including a thin-walled cylindrical plunger tube formed of flexible material and being slidably and rotatably received within said bore; said plunger tube having a generally oval-shaped opening in the wall thereof; said opening having a length greater than its width; a spherical member disposed within said tube having a diameter smaller than the length of said opening but larger than the width thereof; said spherical member being movable radially between an inwardly-displaced inoperative position and an outwardly-displaced operative position in which said member projects outwardly through said opening and is engagable with the threads of said bore; and means for selectively shifting said member in radial directions within said tube; said material of said plunger tube being capable of flexing for increasing the width of said opening to allow forceful insertion of said spherical member there-through during assembly operations and thereafter returning to unflexed condition for retaining said spherical member within said plunger tube.

4,696,204

WATER LEVEL CONTROL DEVICE AND METHOD OF MAKING THE SAME

Thomas M. Buckshaw, Indiana, and David T. Llewellyn, Strongstown, both of Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 29, 1986, Ser. No. 857,636
Int. Cl.[4] H01H *35/34*
U.S. Cl. 74—567 13 Claims



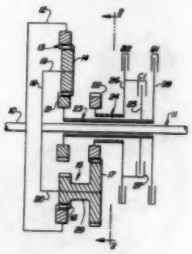
1. In a water level control device comprising a frame means provided with elongated slot means having a first portion, said frame means comprising a substantially flat frame plate having opposite sides with said slot means passing therethrough, movable cam follower means carried by said frame means for setting the desired water levels to be provided by said device, and a slide cam member having projection means extending through said slot means to guide sliding movement thereof relative to said frame means, said projection means having interlocking means interlocking with said frame means while said projection means is disposed in said first portion of said slot means, said cam member having cam surfaces means engaging said cam follower means to set the same in desired water level setting positions thereof when said projection means is in said first portion of said slot means, the improvement wherein said slot means has a second portion thereof for unlocking with said interlocking means when said projection means of said cam member is disposed in said second portion whereby said cam member can be easily detached from or attached to said frame means and wherein said interconnection means of said cam member bears against one of said sides of said frame plate when said projection means is in said first portion of said slot means, said cam member having abutment means bearing against the other of said sides of said frame plate when said projection means is in said first portion of said slot means, said projection means of said cam member being under tension when said projection means is in said first portion of said slot means whereby said interlocking means and said abutment means compress said frame plate therebetween and thereby provide resistance to sliding movement of said cam member relative to said frame means when said projection means is in said first portion of said slot means, said cam surface means having a reset area thereon for resetting said control device when said reset area is engaging said cam follower means, said slot means having a third portion thereof for receiving said projection means of said cam member therein, said reset area of said cam member engaging said cam follower means only when said projection means of said cam member is disposed in said third portion of said slot means, said frame means having means cooperating with said interlocking means to relieve the tension in said projection means when said projection means is disposed in said third portion of said slot means.

4,696,205

THREE-SPEED PLANETARY TRANSMISSION

Jeffrey C. Marks, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Feb. 4, 1986, Ser. No. 826,164
Int. Cl.[4] F16H *57/10*
U.S. Cl. 74—767 10 Claims



1. A multispeed planetary transmission for transferring power between a ring gear shaft and a carrier shaft comprising:

(a) a ring gear fixed concentrically to a ring gear shaft;

(b) a first planet gear set having planet gears all of which mesh with said ring gear;

(c) a second planet gear set having axially inner planet gears meshing with said gear and axially outer planet gears coaxial and coupled for rotation with said inner planet gears;

(d) a planet carrier attached concentrically and nonrotatably to a carrier shaft and having said first and second planet gear sets rotatably mounted thereon;

(e) an axially inner sun gear concentric with said shafts and meshing with said gears of said first planet gear set;

(f) an axially outer speed control gear concentric with said shafts and meshing with said outer planet gears of said second planet gear set;

(g) means for coupling said outer speed control gear with said inner sun gear to obtain a direct drive between said ring gear shaft and said carrier shaft;

(h) means for preventing rotation of said inner sun gear to obtain a first speed ratio between said shafts; and

(i) means for preventing rotation of said outer speed control gear to obtain a second speed ratio between said shafts.

4,696,206

TORQUE WRENCH

James G. Renfro, Spring, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Apr. 10, 1986, Ser. No. 850,313
Int. Cl.[4] B25B *13/50*
U.S. Cl. 81—57.34 5 Claims

1. A tool for gripping a section of pipe, the tool comprising:

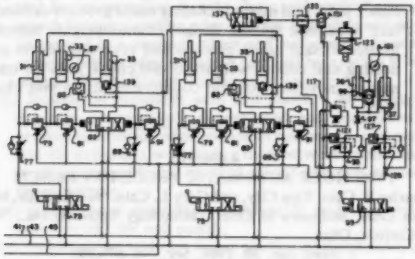
a wrench assembly;

clamping means, on the wrench assembly, for clamping onto the section of drill pipe;

torque means for applying a torque to the wrench assembly, to cause a rotation of the wrench assembly;

power means for supplying hydraulic pressure to the clamping means and the torque means;

adjustment means for adjusting the hydraulic pressure applied to the torque means; and



valve means for causing the hydraulic pressure applied to the clamping means to automatically vary linearly with the hydraulic pressure applied to the torque means.

4,696,207

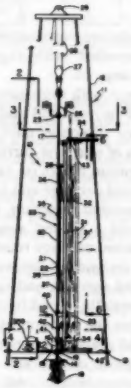
WELL PIPE HANDLING MACHINE

George I. Boyadjieff, Anaheim, Calif., assignor to Varco International, Inc., Orange, Calif.

Division of Ser. No. 727,724, Apr. 26, 1985. This application Apr. 21, 1986, Ser. No. 854,404

Int. Cl.[4] B25B *13/50*

U.S. Cl. 81—57.34 **64 Claims**



29. A well pipe handling machine for use in a rig having a floor and having a string of pipe extending vertically along an axis of a well and having a rack for receiving and holding a series of pipe sections from said string in essentially vertically extending condition, comprising:

a support column structure which extends essentially vertically and is movable generally horizontally to store said sections of pipe in said rack or retrieve them therefrom;

two vertically spaced pipe holding units carried by said support column structure for movement therewith and adapted to hold a section of pipe in vertical condition during such movement;

upper and lower carriage structures connected to upper and lower ends respectively of said column structure;

two synchronized drive mechanisms for actuating said carriage structures genrally horizontally in correspondence with one another between a first position in which the support column structure extends essentially vertically and said pipe holding units support said pipe section in vertical condition in alignment with said axis of the well and a second position in which said support column structure remains in essentially vertically extending condition but is offset horizontally from said first position and said pipeholding units can move a pipe supported thereby in vertical condition into or out of said rack;

pivotal connections attaching upper and lower ends of said column structure to said upper and lower carriage structures repsectively for pivotal movement about a vertical axis offset from the axis of said well to face said rack;

powered means for pivoting said column structure relative to said two carriage structures;

tracks adapted to extend horizontally along said rig floor and guide said lower carriage structure between said first and second positions;

a third carriage structure mounted to said column structure for movement upwardly and downwardly relative thereto and for movement with said column structure pivotally and between said first and second positions thereof;

means for actuating said third carriage structure upwardly and downwardly;

a parallelogram mechanism mounting said two pipe holding units to said third carriage structure for movement upwardly and downwardly therewith relative to the column structure and for movement with the column strucutre between said first and second positions thereof;

said parallelogram mechanism including two swinging arms carrying said pipe holding units respectively and connected to said third carriage structure at vertically spaced locations for swinging movement in unison relative thereto to move the pipe holding units and a carried pipe generally horizontally toward and away from said column structure while retaining the pipe in essentially vertical condition;

actuating means for swinging said arms in unison;

a control station for carrying an operator and having controls for operating the machine, and which control station is connected to said third carriage structure for movement therewith upwardly and downwardly and pivotally and between said first and second posoitions;

a torque wrench connected to said third carriage structure for movement therewith and located near said control station; and

a spinner connected to said third carriage structure for movement therewith and located above and in alignment with said torque wrench.

4,696,208

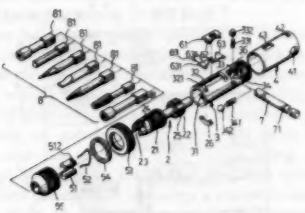
DIRECTION-CHANGEABLE STRUCTURE OF HAND TOOL HANDLE

Tsay T. Lay, No. 11, Alley 22, Sec. 2, Change Ping Rd., Taichung, Taiwan

Continuation of Ser. No. 808,510, Dec. 13, 1985, abandoned. This application Dec. 30, 1986, Ser. No. 948,407

Int. Cl.[4] B25B *13/00*

U.S. Cl. 81—58 **3 Claims**



1. A direction-changeable handle structure for a hand tool comprising:

(a) a body having a gear wheel attached thereto near a first

end portion of the body, a second portion of the body having threads, and defining a slot and a chucking block seat;

(b) two arc plates extending from said chucking block seat having flat inner faces so as to form a rectangular shape when engaged with a pair of chucking blocks;

(c) a pair of chucking blocks connected by a spring clip which is located in said slot of said body, the chucking block being disposed in the chucking block seat;

(d) first and second rings threadedly attached to the second end of the body so as to transmit torque to the body, said first ring, having a relatively greater thickness, and said second ring being screwed on the threads of said body, said second ring having a relatively smaller thickness and being screwed on said threads after said first ring;

(e) a chuck bearing against a portion of the chucking blocks and threadedly engaging with the second end portion of the body adjacent to the second ring so as to attach a variety of tools to the handle;

(f) a coupling tube concentrically arranged about the body, the coupling tube defining an "H" shaped slot, a key way, a transverse hole and a spring attachment hole;

(g) a key member disposed in the key way and bearing against the body to prevent removal of the body from the coupling tube to keep the body in its position;

(h) a substantially "T" shaped plate disposed in each leg of the "H" shaped plate engaging with the gear wheel;

(i) switch means connected to the "T" shaped plates such that either one or both may engage the gear wheel so as to control the direction of torque which is exerted by the handle, the switch means being manually manipulable from the exterior of the coupling tube;

(j) a sleeve concentrically arranged about the coupling tube, the sleeve defining openings aligned with the transverse hole of the coupling tube, a switch opening and a spring attachment opening;

(k) spring biased attachment means located in the spring attachment hole and a engaging button for attaching the sleeve to the coupling tube; and

(l) ball detent means located in the coupling tube so as to retain a handle bar inserted into the transverse hold.

4,696,209

LATHE HAVING AN INTEGRATED CHUCK

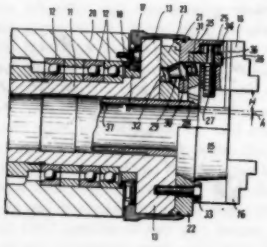
Klaus Felten, Waldbronn; Walter Honroth, Osterrainen; Siegfried Kuhn, Dürnau; Hermann Schulten, Birenbach, and Bruno Zeller, Lauterstein, all of Fed. Rep. of Germany, assignors to Oerlikon-Boehringer GmbH, Goppingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 531,344, Sep. 12, 1983, abandoned. This application Mar. 15, 1985, Ser. No. 712,356

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1982, 3233914

Int. Cl.[4] B23B *31/14*

U.S. Cl. 82—40 R **5 Claims**



1. A lathe comprising:

a headstock spindle having a flange on one end thereof;

a chuck body having a chuck base integral with said spindle flange;

chuck jaws mounted on said chuck body;

means for compensating for centrifugal force acting on said chuck jaws, said means including radial grooves defined in said headstock spindle flange, counterweights movably located in said radial grooves and reversing levers connecting said counterweights to said chuck jaws for transmitting movement of said counterweights to said chuck jaws.

4,696,210

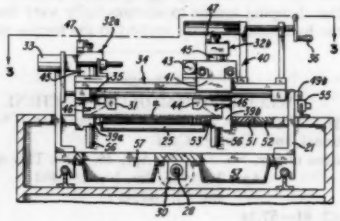
TWO HOLE AUTOMATIC PRECISION PUNCH

Charles E. Cain, Tipp City, and Gary L. Cain, New Carlisle, both of Ohio, assignors to Chief Technology Systems, Inc., New Carlisle, Ohio

Filed Jun. 30, 1986, Ser. No. 879,895

Int. Cl.[4] B21D *28/04*; B26F *1/38*

U.S. Cl. 83—33 **8 Claims**



8. A method of producing registration holes in a sheet-like workpiece that is provided with registration marks, said method including the steps of:

providing a workpiece with registration marks;

moving one of a first carriage and said workpiece relative to the other in a first direction until a first sensor means senses the position of said first carriage relative to a given one of said registration marks on said workpiece;

moving one of a second carriage and said workpiece relative to the other in a second direction, at right angles to said first direction, until a second sensor means senses the position of said second carriage relative to said same given registration mark on said workpiece;

moving one of a third carriage and said workpiece relative to the other substantially in said first direction until a third sensor means senses the position of said third carriage to another one of said registration marks on said workpiece;

punching out said given one of said registration marks to produce a registration hole in said workpiece; and

punching out said another one of said registration marks to produce another registration hole in said workpiece.

4,696,211

METHOD AND APPARATUS FOR NIBBLING CUTOUTS WITH RECTILINEAR AND CURVILINEAR CONTOURS BY ROTATION OF TOOLING WITH CUTTING SURFACES OF RECTILINEAR AND CURVILINEAR CONTOURS AND NOVEL TOOLING THEREFOR

Hubert Bitzel, Ditzingen, Fed. Rep. of Germany, assignor to Trumpf GmbH & Co., Ditzingen, Fed. Rep. of Germany

Filed Oct. 18, 1984, Ser. No. 662,132

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.[4] B26D *5/22*

U.S. Cl. 83—49 **13 Claims**

1. In a method for nibbling contoured cutouts with both curvilinear and rectilinear portions in a sheet-like workpiece, the steps comprising:

(a) providing a punch press having a frame with a base and

a head spaced thereabove, a ram assembly on the head including a lower portion reciprocatable along a vertical axis relative to the base of said punch press frame;

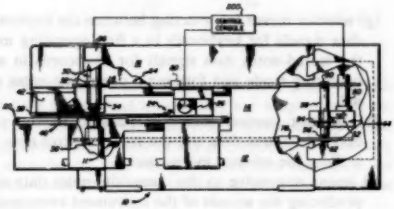
(b) locating a punch in alignment with said ram lower portion for reciprocation thereby along said vertical axis, said punch having a cutting edge portion extending across the lower end in a common plane and including at least one arcuate cutting edge surface A^1 defined by a radius R^1 and at least one rectilinear cutting edge surface A^2;

(c) locating in alignment with said punch a die having an aperture cooperatively dimensioned and configured to receive said cutting edge portion of said punch, said punch and die defining a workstation therebetween substantially in alignment with said vertical axis of said ram assembly lower portion;

(d) supporting a sheet-like workpiece at said workstation between said die and punch;

(e) reciprocating said ram lower portion to reciprocate and drive said cutting edge portion of said punch through said workpiece at said workstation to produce a cutout;

(f) indexing said workpiece in horizontal plane a predetermined distance relative to said workstation, said distance being less than the length of a first one of said punch cutting edge surfaces;



(g) rotating said punch and die at said workstation substantially at and about said vertical axis a predetermined amount to orient a desired one of said cutting edge surfaces at the desired angular position for the desired contour of a large contoured cutout in said workpiece;

(h) reciprocating said ram lower portion to drive said cutting edge portion of said punch through said workpiece at said workstation to produce a second cutout contiguous to said first cutout; and

(i) repeating steps (f)–(h) to produce a large contoured cutout, at least some of said rotation steps effecting rotation of said punch and die substantially at and about said vertical axis to orient the other one of said cutting edge surfaces at the desired angular position for the desired contour of the large contoured cutout in said workpiece and at least some of said rotation steps consecutively effecting rotation of said punch and die substantially in and about said vertical axis to orient the same cutting edge surface at the desired angular position for that portion of the desired contour of the large contoured cutout in said workpiece, thereby defining said contour of said large contoured cutout with rectilinear surface portions and arcuate surface portions by at least said two cutting surfaces.

4,696,212

ROTARY CUTTER

Masateru Tokuno, Nishinomiya; Tetsuya Sawada, Kyoto, and Yasuharu Mori, Amagasaki, all of Japan, assignors to Rengo Co., Ltd., Osaka, Japan

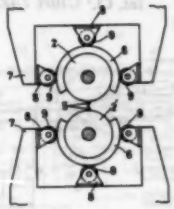
Filed Jun. 16, 1986, Ser. No. 874,964

Claims priority, application Japan, Jun. 17, 1985, 60-132821

Int. Cl.[4] B26D *1/62*; B23D *25/12*; B27L *5/08*

U.S. Cl. 83—343 **4 Claims**

1. A rotary cutter for cutting a web material to desired lengths, said rotary cutter including a pair of rolls mounted to rotate synchronously in opposite directions, a knife fixedly mounted on each of said rolls so as to extend axially to cut the web material fed to a position between said rolls, and driving means for driving said rolls, characterized in that a plurality of rolling bodies are arranged around each of said rolls to bear the



shock upon cutting through said rolls, that a plurality of raised portions are provided on the outer periphery of each roll so as to extend circumferentially except near said knife, and that said rolling bodies are adapted to roll on said raised portions, preventing said knives from hitting said rolling bodies.

4,696,213

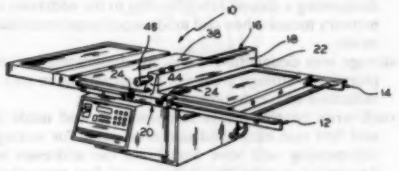
TOOL FINE ADJUSTMENT MECHANISM

Martin L. Conneally, Lombard, Ill., assignor to Sears, Roebuck & Co., Chicago, Ill.

Filed Jan. 2, 1986, Ser. No. 815,525

Int. Cl.[4] B23Q *3/02*; B26D *7/01*

U.S. Cl. 83—438 **14 Claims**



1. In a tool having a laterally slidable adjustment means including a corresponding track and guide slidable thereon, and having means for releasably securing said guide on said track in a selected position of adjustment, the improvement comprising:

friction drive means operatively associated with said guide so as to normally be free of friction driving engagement with said track, said friction drive means being selectively manually frictionally engageable with said track, said friction drive means cooperating with said track for making fine adjustments in the position of said laterally slidable adjustment means of said tool;

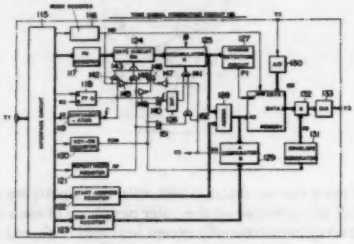
said guide including a pair of spaced apart surfaces adapted to be disposed on opposite sides of said track in generally parallel relation thereto, said spaced apart surfaces of said guide being joined by a transversely extending wall disposed in generally parallel relation to said track, said wall including an opening facing outwardly away from said track and said friction drive means being accessible through said opening for manual operation thereof;

said friction drive means including a rotatable member disposed about an axis extending generally perpendicular to said spaced apart surfaces of said guide, said rotatable member having a portion extending through said opening in said wall of said guide and frictionally engageable with said track for rotationally driven movement therealong.

4,696,214
ELECTRONIC MUSICAL INSTRUMENT

Tetsuji Ichiki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 10, 1986, Ser. No. 917,909
Claims priority, application Japan, Oct. 15, 1985, 60-229081
Int. Cl.[4] G10H *7/00*
U.S. Cl. 84—1.01 **7 Claims**



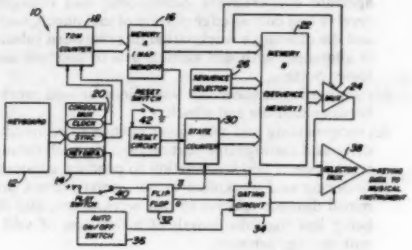
1. An electronic musical instrument comprising:
mode selection means for selecting one of a plurality of modes including sampling and play modes, said mode selection means outputting a mode signal representative of the selected mode;
transducer means for converting a tone into a tone signal representative of said tone;
memory means comprising a plurality of storage areas each having a plurality of addresses;
read/write rate designation means for outputting a first rate signal designating a first rate of access to the addresses of said memory means when said mode signal represents said sampling mode, and for outputting a second rate signal designating a second rate of access to the addresses of said memory means when said mode signal represents said play mode;
storage area designation means for designating one of said plurality of storage areas and for outputting an area signal indicative of the designated storage area;
read/write control means responsive to said mode signal, said first rate signal and said area signal for storing data representing said tone signal into the addresses in said designated storage area only at said first rate when said mode signal represents said sampling mode, and responsive to said mode signal and said second rate signal for reading data from the addresses in said plurality of storage areas at said second rate when said mode signal represents said play mode; and
tone generating means for generating a tone in accordance with the data read from said memory means.

4,696,215
MANUALLY CONTROLLED PERFORMANCE APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT

Walter L. Greenwood, Alburtis, Pa., assignor to Allen Organ Company, Macungie, Pa.

Filed Sep. 24, 1985, Ser. No. 779,764
Int. Cl.[4] G10F *1/00*; G10H *7/00*
U.S. Cl. 84—1.03 **10 Claims**

1. An electronic musical instrument comprising:
(a) manually actuated control means for generating operator-derived control data,
(b) at least two keyboards,
(c) time-division multiplexing means for encoding key actuations of the keyboards into time-division multiplexed keyboard-notes data signals,
(d) memory means for storing note data representative of predetermined combinations of musical notes,
(e) preprogrammed addressing means synchronous with the time-division multiplexing means for generating mode control data representative of predetermined operating modes for each of the keyboards and address data for addressing the note data stored in the memory means,
(f) counter means responsive to the operator-derived control data for enabling the memory means to recall therefrom time-division multiplexed stored-notes data signals representative of the predetermined combinations of musical notes associated with respective counts of the counter means,

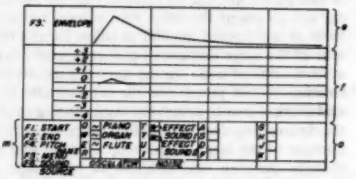


(g) selector means for selecting between the keyboard-notes data signals for keyboards in a first operating mode and the stored-notes data signals for keyboards in a second operating mode and forming a composite-notes data signal,
(h) selector control means responsive to the operator-derived control data and the mode control data for controlling the selector means, and
(i) means responsive to the composite-notes data signal for producing the sounds of the instrument corresponding to the notes encoded in the composite-notes data signal.

4,696,216
ACOUSTIC OUTPUT DEVICE FOR PERSONAL COMPUTER

Takeoki Asahi, Ikoma, and Toshihiko Yoshida, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 31, 1985, Ser. No. 739,852
Claims priority, application Japan, May 31, 1984, 59-112740
Int. Cl.[4] G10H *1/057, 7/00*; G09B *15/04*
U.S. Cl. 84—1.13 **12 Claims**



1. An acoustic output device comprising:
envelope setting means for creating elements of a tone, including creating an envelope pattern representing elements of said tone over time and having a plurality of user defined envelope segments;
first storage means, responsive to said envelope setting means, for storing data representative of each envelope segment of said tone;
music note setting means for setting note information for a piece of music;
second storage means, responsive to said music note setting means, for storing the note information;
acoustic output means responsive to said music note setting

means and said envelope setting means for reading-out the note information and said data and providing a tone having said elements with the plurality of envelope segments represented by said data; and

display means, responsive to said envelope setting means, for displaying note information having the envelope pattern created thereby.

4,696,217

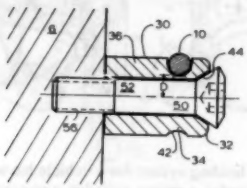
HARP AND IMPROVED STATIONARY NUT

William MacWilliams, Oakbrook Terrace, Ill., assignor to Lyon & Healy Harps Inc., Chicago, Ill.

Filed Oct. 1, 1986, Ser. No. 913,983

Int. Cl.[4] G10D *1/04*

U.S. Cl. 84—266 **4 Claims**



4. In a musical harp, comprising a soundboard and a multiplicity of harp strings, and a stationary nut adapted to be engaged for a limited length extent circumferentially by a said harp string extending from a tuning pin, about said stationary nut to a soundboard, said string between said stationary nut and said soundboard, extending between sharpening pins of the action plate,

the improvement wherein,

for adjusting the position of said string relative to said sharpening pins of said action plate,

said stationary nut comprises:

a annular collar defining a central bore and, on its outer surface, a generally circumferential groove sized and adapted to be engaged by said harp string, and

an elongated shaft sized and adapted to extend through said central bore for fastening said annular collar to said harp,

the respective axes of said elongated shaft and said generally circumferential groove defined about said collar being different, and relative rotation between said collar and said shaft is effective to change the radial distance of a segment of the groove surface supporting the harp string from the axis of the shaft in a manner to change the position of said string relative to said sharpening disk,

whereby the said harp string may be centered on the action plate for improved playing tone of said harp.

4,696,218

FASTENING MEANS FOR GUITAR STRINGS

Yoshihiro Hoshino, Nagoya, and Kazuhiro Matsui, Aichi, both of Japan, assignors to Hoshino Gakki Co., Ltd., Japan

Filed Sep. 8, 1986, Ser. No. 904,278

Claims priority, application Japan, Dec. 13, 1985, 60-192393[U]

Int. Cl.[4] G10D *3/14*

U.S. Cl. 84—297 R **11 Claims**

1. A tailpiece section for a stringed musical instrument including:

a string stopping member;

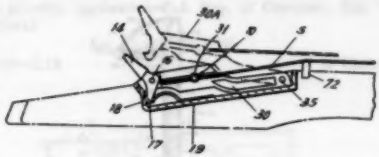
a string;

a retaining member secured to said string at a predetermined location thereof in the vicinity of its tail end;

said stopping member including a holding formation for engaging said retaining member;

a saddle disposed at a position forward of said retaining member for supporting said string while it is in tension;

said stopping member being mounted for movement between a first position for string tensioning and a second position for string relaxation;



a releasable latch for retaining said stopping member in said first position;

said retaining member being deformed to lock same at said predetermined location.

4,696,219

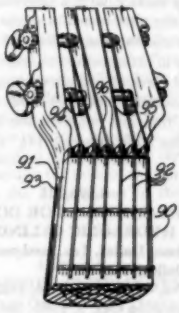
NUT FOR STRINGED INSTRUMENTS

Ralphael Plescia, 1048 California Ave., Salt Lake City, Utah 84104

Filed Mar. 14, 1986, Ser. No. 839,899

Int. Cl.[4] G10D *3/04, 3/06, 3/12*

U.S. Cl. 84—314 N **17 Claims**



1. An improved nut for positioning near the fingerboard of a stringed instrument and for supporting strings of the instrument above a level of the fingerboard, said nut comprising:

a nut body configured for snug fit with respect to the fingerboard and neck of the instrument, said body having a front face for placement proximate to the fingerboard, a back face, a base for secure mounting of the nut with respect to the neck of the instrument and a crown having string support means for positioning and retaining the strings at properly spaced distances with respect to adjacent strings and above the fingerboard;

the crown of the nut being formed of two separate alternating sections wherein the first section comprises the string support means positioned at appropriate heights above the level of the fingerboard for proper positioning of strings;

the second section of the nut comprising a fluted portion between at least two adjacent string support means wherein most of the space between (i) the two adjacent strings, (ii) the front and back nut faces and (iii) the level of the fingerboard and level of the strings is void of nut material;

the string support means being thereby adapted for receiving and transmitting increased vibrational energy from the string into the neck and fingerboard of the instrument.

4,696,220

VIOLIN STUDENT SIZING DEVICE

Michael J. Pagliaro, 219 Sprain Rd., Scarsdale, N.Y. 10583

Filed Dec. 10, 1986, Ser. No. 940,111
Int. Cl.[4] G10G *7/00*
U.S. Cl. 84—453 4 Claims

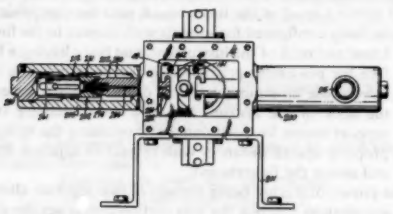
1. A violin student sizing device comprises: a chin rest having a flat bottom surface that rests on the shoulder of the student and a top surface with a depression that conforms in configuration to the chin rest of a violin and which the chin and cheek of the student rest; a first rod having an elongated slot and markings in juxtaposition to said slot and connected to said chin rest; and a second rod telescoping within said first rod and having a measuring dowel that slides within said elongated slot of said first rod; and wherein the length of said sizing device ranges from approximately 14½" to 23½".

4,696,221

DUAL VALVE CONTROL FOR DOUBLE ACTION HYDRAULIC CYLINDER

William M. Dollison, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Division of Ser. No. 449,823, Dec. 14, 1982, Pat. No. 4,571,939.
This application Oct. 9, 1985, Ser. No. 785,886
Int. Cl.[4] F15B *13/02*
U.S. Cl. 91—51 8 Claims



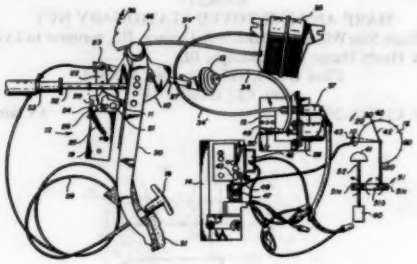
1. A device for direction control of a double action hydraulic cyclinder comprising: spaced supply-exhaust fluid control valves having means for fluid connection, respectively, with the extend and retract opposing power ends of said hydraulic cylinder; drive means including a fluid motor; a scotch-yoke coupling said motor with said fluid control valves for operating said valves; a pilot valve coupled with said scotch-yoke for controlling fluid to said motor; means for supplying fluid to said pilot valve; and release valves for controlling said fluid control valves operated by said motor.

4,696,222

BRAKE HOLDING SYSTEM

Joon H. Han, 816 Gregorio Dr., Silver Spring, Md. 20901

Continuation-in-part of Ser. No. 763,715, Aug. 8, 1985, Pat. No. 4,646,903. This application Dec. 5, 1985, Ser. No. 804,786
The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.
Int. Cl.[4] B60K *41/24*
U.S. Cl. 192—3 H 12 Claims



1. A brake holding system for a vehicle having, in combination, a brake pedal, a master cylinder, a vacuum system and a power supply, which comprises

a moon gear having a plurality of teeth on one side thereof, said moon gear being operably connected to the master cylinder,

a spring biased holding unit adapted to engage the teeth of the moon gear, against said spring bias whenever the holding system is activated,

an on/off member,

a vacuum actuator providing communication between said holding unit and said on/off member,

a speed monitoring device operatively associated with a speedometer and communicating with said on/off member for automatically activating said holding unit upon the application of the brake pedal against said spring bias to engage said moon gear during the time when the speed of the vehicle is reduced to between 0 and 5 mph, and

releasing switch communicating with said on/off member for disengaging said holding unit upon the depression of an accelerator pedal.

4,696,223

PNEUMATIC PRESSURE ACTUATOR

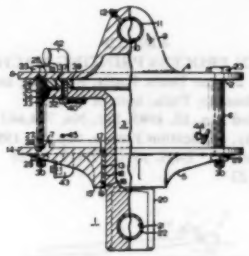
Charles T. Link, Pleasant Hills; Bennie M. Gray, Pittsburgh, and Harold L. Shumaker, Monroeville, all of Pa., assignors to American Standard Inc., Pittsburgh, Pa.

Continuation of Ser. No. 105,325, Dec. 19, 1978, abandoned.
This application Jun. 18, 1987, Ser. No. 274,956
Int. Cl.[4] F01B *31/00*
U.S. Cl. 92—86.5 2 Claims

1. A short stroke fluid motor comprising, a cylinder assemblage and a metallic piston having an enlarged head portion formed on one end and having a piston rod integrally formed on the other end, said cylinder assemblage including a metallic top header casting, a metallic bottom header casting, and an all-plastic cylinder casing fixedly secured between said top and bottom header castings, said top header casting and said enlarged head portion of said metallic piston being hollowed out to lessen the mass of the fluid motor, said piston rod passing through a bore located in said bottom header casting for permitting said metallic piston to reciprocate in said plastic cylinder casing, a cushion ring carried by said enlarged head portion of said hollow metallic piston, said cushion ring includes a grease accommodating V-groove facing the inner wall of said plastic cylinder to reduce wear and to provide a better seal between said piston and said cylinder and to prevent said enlarged head portion from contacting said plastic cylinder

casing, and said plastic cylinder casing is made of moly-disulfied fiberglass material.

2. A short stroke fluid motor comprising, a cylinder assemblage and a metallic piston having an enlarged head portion formed on one end and having a piston rod integrally formed on the other end, said cylinder assemblage including a metallic top header casting, a metallic bottom header casting, and an all-plastic cylinder casing fixedly secured between said top and bottom header castings, said top header casting and said enlarged head portion of said metallic piston being hollowed out to lessen the mass of the fluid motor, said piston rod passing



through a bore located in said bottom header casting for permitting said metallic piston to reciprocate in said plastic cylinder casing, a cushion ring carried by said enlarged head portion of said hollow metallic piston, said cushion ring includes a grease accommodating V-groove facing the inner wall of said plastic cylinder to reduce wear and to provide a better seal between said piston and said cylinder and to prevent said enlarged head portion from contacting said plastic cylinder casing, and a grease fitting and petcock are provided on the outside of said plastic cylinder casing to permit the lubricating of said cushion ring.

4,696,224

PISTON FOR INTERNAL COMBUSTION ENGINE

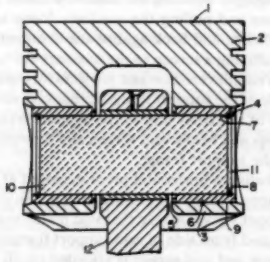
Yoshibumi Mishima, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1984, Ser. No. 682,420

Claims priority, application Japan, Dec. 21, 1983, 58-196965[U]

Int. Cl.[4] F16J 1/14

U.S. Cl. 92—187 **4 Claims**



1. A piston and piston pin for an internal combustion engine, wherein the improvement comprises a piston made of an aluminum alloy having two spaced piston pin bosses, a bushing made of a material having a smaller thermal expansion coefficient than said aluminum alloy fitted in the inner circumference of each of said piston pin bosses, and a piston pin made entirely of ceramic fitted in said bushings.

4,696,225

AIR FILTER ARRANGEMENT FOR VEHICLE AIR-CONDITIONING SYSTEM

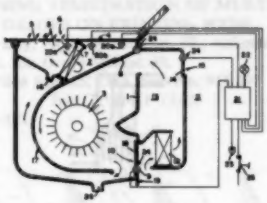
Karl-Heinz R. Weller, Gerlingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 9, 1986, Ser. No. 871,790

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520413

Int. Cl.[4] B60H 3/06

U.S. Cl. 98—2.11 **23 Claims**



1. An air filter arrangement for a heating or air conditioning system of a motor vehicle comprising:

filter means arranged in an air inlet flow means between the outside of the vehicle and the passenger space of the vehicle;

fan means arranged behind the filter means in the direction of the passenger space of the vehicle; and

flow altering means for altering the air flow path;

wherein, during normal operation, the flow altering means are arranged so as to cause air flow from the outside of the vehicle, through the inlet flow means, filter means, to an inlet of the fan means and into the passenger space, and during an air filter cleaning operation, the flow altering means are arranged so as to cause air flow from the passenger spaced through the inlet of the fan means, the inlet flow means and the filter means to the outside of the vehicle.

4,696,226

FLUID BARRIER CURTAIN SYSTEM

Warner H. Witmer, Penn Center Plaza, Quakertown, Pa. 18951

Filed Aug. 28, 1986, Ser. No. 901,380

Int. Cl.[4] F24F 9/00

U.S. Cl. 98—36 **5 Claims**

1. A fluid barrier curtain at an aperture to maintain separation of fluids on opposite sides of said barrier curtain while permitting passage of objects through said aperture, comprising:

means defining an aperture zone through which objects may pass;

and a fluid curtain barrier system for substantially opposing transverse interchange of fluids across said aperture zone, said fluid curtain barrier system comprising

means for supplying fluid to the fluid curtain barrier system,

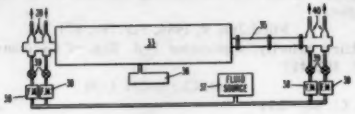
fluid flow shaping means directing the supplied fluid flow in a concentrated laminar sheet substantially within said zone and from one boundary of said zone toward an opposite boundary thereof,

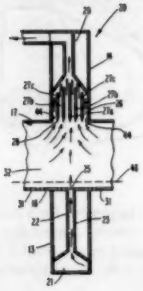
receiving means located opposite said laminar fluid flow shaping means for receiving a resulting flow stream and fluids entrained therewith and inducing the fluids arriving in its vicinity to be collected together and caused to emerge from said aperture zone as a coherent fluid effluent, said receiving means including an opening extending across the opposite boundary of said aperture zone,

said opening being wider in the direction transverse of said aperture zone than the width of the laminar sheet of fluid exiting said fluid flow shaping means,

a box-like housing extending from said opening away from the aperture zone, and

a plurality of spaced-apart vanes fixedly poisitioned in said housing and having thin edges substantially coplanar with





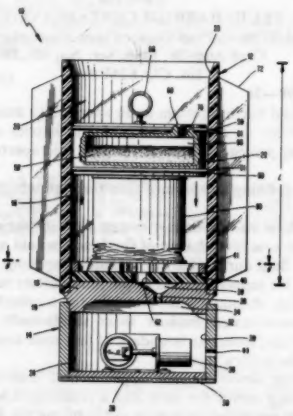
said opening, said vanes being substantially parallel to said aperture zone through which objects may pass and serving to separate the fluid flowing out of the aperture zone into laminar-flow segments.

4,696,227

PRESS FOR COMPACTING SMALL SCALE OBJECTS

W. Jeffrey Van Buskirk, P.O. Box 1385, 302 S. Leach St., Hobbs, N. Mex. 88240

Filed May 16, 1986, Ser. No. 863,695
Int. Cl.[4] B30B *1/16, 1/42*
U.S. Cl. 100—902 **23 Claims**



1. A self-contained, manually portable press for compacting small scale objects, comprising:

a hollow, cylindrical housing having a floor and sidewalls extending substantially perpendicularly therefrom to define a housing cavity;

compacting means slidable within said housing cavity, said compacting means including means arranged to travel with said compacting means in said housing cavity in close proximity to said sidewalls; and

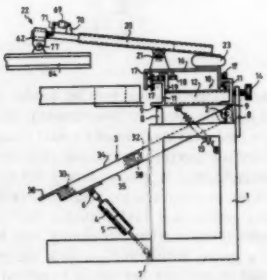
means for drawing said compacting means toward said floor of said housing cavity, said drawing means being arranged within the housing for drawing said compacting means downwardly with sufficient force to substantially crush an object positioned between the compacting means and the floor of the housing cavity.

4,696,228

SCREEN PROCESS PRINTING MACHINE

Bernard David, 20, rue Denis Papin, Bagnolet, and Roger Tetard, 5, rue Bassano, Paris, both of France

Filed Sep. 10, 1985, Ser. No. 774,463
Claims priority, application France, Sep. 11, 1984, 84 14227
Int. Cl.[4] B41L *13/02;* **B41F** *15/26*
U.S. Cl. 101—123 **5 Claims**



1. A screen printing machine comprising:

a support frame comprising vertical and horizontal members and having a rear side, a front side spaced horizontally forward therefrom, and a plurality of stanchions projecting upward between the front and rear sides;

an auxiliary frame lying and horizontally movable on the stanchions and projecting forward past the front side of the support frame;

an abutment fixed on the support frame behind the auxiliary frame;

a spring engaged between the auxiliary frame and the support frame and pulling the auxiliary frame down against the stanchions and back against the abutment;

means for affixing a screen to the auxiliary frame so that said screen is cantilevered on and projects forward beyond the front side of the support frame so that said screen lies fully forward of the front side of the support frame;

a platen disposed below said screen and forward of the front side of the support frame;

means including a horizontal pivot disposed at the rear side of the support frame for pivoting the platen on the support frame about a pivot axis so that said platen projects wholly beyond said front side of said support frame and access to said platen and said screen is afforded on all sides thereof except for rear edges of said screen and said platen which are proximal to said support frame;

a carriage displaceable along said auxiliary frame generally parallel to the axis defined by said pivot; and

a scraping and lapping device overlying said screen and cantilevered from said carriage so as to be disposed wholly forward of said front side of said support frame above the screen and plate.

4,696,229
ROTARY OFFSET PRINTING PRESS EQUIPPED FOR FLYING PLATE CHANGE

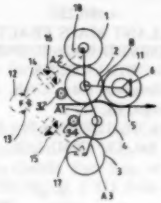
Wilhelm Bezler, Augsburg, and Ingo Kobler, Anhausen, both of Fed. Rep. of Germany, assignors to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Mar. 25, 1986, Ser. No. 843,988

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1985, 3510822; Mar. 26, 1985, 3510823

Int. Cl.[4] B41F *5/04, 5/22*

U.S. Cl. 101—177 **6 Claims**



1. Rotary off-set printing press utilizing a multiple array of roller cylinders capable of dual-mode selective operation, either as a prime and verso offset-printing press in which a strip to be printed may be printed simultaneously on both sides or else as a single-side printing press equipped for changing plates on the plate cylinder of a first pair of offset-printing cylinders while the press continues uninterruptedly to print with a second pair of offset-printing cylinders against a counterpressure cylinder common to both pairs of offset-printing cylinders, each of said cylinder pairs including a plate cylinder and a rubber-cloth surfaced cylinder, and comprising, in addition to said pairs of cylinders and said counterpressure cylinder:

axle positioning means for shifting the axle of at least one cylinder of at least one of said first and second pairs of cylinders between a first position in which said rubber cloth cylinders of said first and second pairs are able to print on a strip of printable material passing between them and a second position in which said rubber cloth cylinders of said first and second cylinder pairs are spaced apart so that one of them can be driven while the other remains at rest and also for axle shifting from said second position such as to relatively approach or separate each of said rubber cloth cylinders of said first and second cylinder pairs, selectively, respectively to or from said counterpressure cylinder, respectively for printing and for flying plate change;

a main drive for providing rotary power for operating said printing press;

first operating means for operating said printing press in prime and verso offset-printing comprising;

first rotary force transmitting means for transmitting force from said main drive for driving said rubber cloth cylinder of both said first and second cylinder pairs when said axle positioning means is in said first position thereof, and

means for driving a drive gear of said counterpressure cylinder with rotary force derived from said main drive whereby said counterpressure cylinder may serve as a feed-out cylinder for printed strip, and

second means for operating said offset-printing press as a single-side printing press with facility for plate change without stopping the press, including:

first controllable power-transmission means for selectively driving either said rubber cloth cylinder of said first offset-printing cylinder pair or said rubber cloth cylinder of said second offset-printing cylinder pair by force derived from said main drive while the other of said first and second cylinder pairs is enabled to be disconnected from said main drive by said axle-positioning means, then subjected to a plate change and then brought back into connection with said main drive, and

auxiliary drive means connectable for transmitting rotary force to said first or said second cylinder pair for putting into rotation and accelerating a said cylinder pair disconnected from said main drive and bringing it into synchronism for engagement with said main drive.

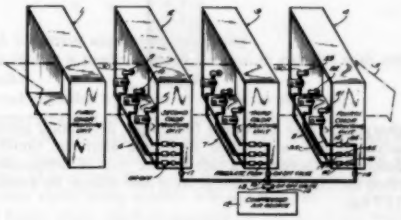
4,696,230
ADJUSTABLE BUSTLE-FORMING APPARATUS FOR MAINTAINING REGISTRATION OF MULTICOLOR IMAGES ON PRINTING WEBS

George J. Barkley, North Barrington, Ill., assignor to Barkley Corporation, Elk Grove Village, Ill.

Filed Sep. 25, 1986, Ser. No. 911,397

Int. Cl.[4] B41F *13/02*

U.S. Cl. 101—181 **21 Claims**



1. A combination wheel-air bustling device for producing an adjustable bustle in a printing web as it travels between successive printing units of a multicolor printing press,

such device comprising supporting means having mounting means for mounting such supporting means in a selected location between the successive printing units and opposite the printing web,

carriage means movably mounted on such supporting means for movement in a direction generally perpendicular to the printing web,

air nozzle means mounted on such carriage means to direct an air jet against the web for producing a bustle therein,

bustle wheel means mounted on such carriage means to engage and deflect the web for producing a bustle therein,

selecting means to produce relative movement between the bustle wheel means and the air nozzle means for selectively bringing either the air nozzle means or the bustle wheel means into its operative bustle-forming relationship with the printing web to form a bustle therein,

and adjusting means for producing adjusting movement of the carriage means and the selected air nozzle means or bustle wheel means in a direction generally perpendicular to the printing web for adjusting the depth of the bustle formed therein by the selected air nozzle means or bustle wheel means.

4,696,231
SHOCK-RESISTANT DELAY DETONATOR

Paul J. Bryan, Hewitt, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

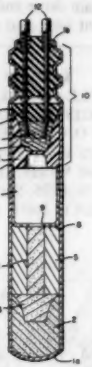
Filed Feb. 25, 1986, Ser. No. 832,777

Int. Cl.[4] F42B *3/10;* **F42C** *19/08*

U.S. Cl. 102—202.5 **9 Claims**

1. In a delay detonator comprising a tubular metal shell integrally closed at one end and containing, in sequence from the closed end, (a) a base charge of a detonating explosive composition, of pentaerythritol tetranitrate (b) a priming charge of a heat-sensitive detonating explosive composition, (c) a delay charge of an exothermic-burning composition, and

(d) an ignition assembly for igniting said delay charge, the improvement comprising a priming charge of lead azide above-standard weight weighing at least 0.26 grams and output level of a magnitude which adapts the detonator, without reinforcement of said shell around said base and priming



charges, to give consistent full-output detonation upon being actuated in a water-filled steel pipe after the simultaneous detonation therein of a side-by-side pair of detonators separated therefrom, base charge from base charge, by a distance of 12.7 cm.

4,696,232

DETONATOR SAFETY DEVICE FOR A WEAPON

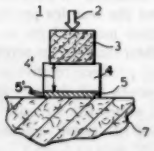
Manfred Held, Aresing, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Nov. 19, 1985, Ser. No. 799,407

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443331

Int. Cl.[4] F42C *15/34*

U.S. Cl. 102—254 **8 Claims**



1. A detonator safety device having a safety position and a firing position, for a weapon including a main explosive charge, said detonator safety device comprising a detonator charge, a detonator member for firing said detonator charge, an igniter plate having a protecting function and an igniter function, said igniter plate being arranged between said detonator charge and said main explosive charge for transmitting a firing impact to said main explosive charge when said detonator safety device is in its firing position, and means for mounting said igniter plate in said safety position at a predetermined first distance (4') from said detonator charge, said predetermined first distance (4') being sufficient for preventing a transmission of said firing impact to said main explosive charge when said igniter plate is in said safety position, whereby said igniter plate performs said protecting function if said detonator charge should be accidentally fired in said safety position of said igniter plate to avoid firing the main explosive charge in said safety position, said detonator safety device further comprising means for providing a second distance (6) between said igniter plate and said main explosive charge in said firing position in which said igniter plate is enabled to perform said igniter function, wherein said mounting means permit resting said igniter plate on said main explosive charge in said safety position, and wherein said means for providing said second distance (6) comprise means for shifting said igniter plate out of said safety position away from said main explosive charge, toward said detonator charge in said firing position, whereby said igniter plate rests against said detonator charge in said firing position.

4,696,233

HIGH PROPELLANT MASS FRACTION HIGHLY STRESS RELIEVED END-BURNING GRAIN STRUCTURE

Ronald B. Paxton, Brigham City, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Jan. 31, 1986, Ser. No. 824,806

Int. Cl.[4] C06D *5/06*

U.S. Cl. 102—287 **9 Claims**

1. A high propellant mass fraction highly stress relieved end-burning grain structure for a rocket motor comprising,

first and second longitudinal propellant components, said components being cured in side-by-side relation to create a cylindrical structure with internal mating surfaces, as seen in cross section, having a substantially "S" shape,

at least one longitudinal inhibiting means having substantially an "S" shape in cross section formed on and completely covering the internal mating surfaces of said propellant components, and

insulation means formed on and substantially completely covering the outer longitudinal surfaces of said components.

4,696,234

DEVICE FOR DESTROYING WATER MINES AND MINE-SWEEPING METHOD

Hans-Joachim Kaltmann, Düsseldorf, and Hermann Schaper, Vallendar, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 7, 1986, Ser. No. 894,405

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528329

Int. Cl.[4] F42B *1/02, 23/26*

U.S. Cl. 102—308 **16 Claims**

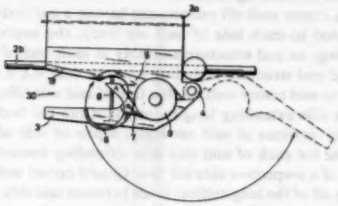
1. A versatile apparatus for destroying water mines comprising

at least one drive means for moving the apparatus through the water,

a carrier removably affixed to the drive means and having forward and rearward portions,

an actuable gripping means carried by the carrier, for selectively contacting a part of a mine selected from the group consisting of a cable of a mine and the outer surface of a mine,

an actuable buoyancy-producing means carried by the carrier, and



at least one detonator-actuated pyrotechnic charge carrier by the carrier for explosive destruction of the mine.

4,696,235

STEEL ROADWAY FOR MAGNETIC TRACKS

Peter Wagner, Frankfurt, Fed. Rep. of Germany, assignor to Geri Engineering GmbH, Fed. Rep. of Germany

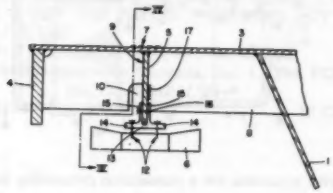
PCT No. PCT/EP85/00135, § 371 Date Jul. 15, 1985, § 102(e) Date Jul. 15, 1985

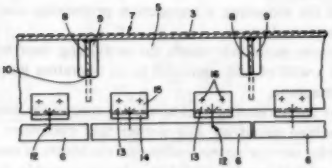
PCT Filed Mar. 29, 1985, Ser. No. 760,756

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412401

Int. Cl.⁴ E01B *25/08*; B60L *13/04*

U.S. Cl. 104—124 **2 Claims**





1. A steel roadway for magnetic tracks with a roadway support, including a cover plate forming an upper securing member, which is connected at its lower side along the two longitudinal edges thereof with a side guiderail and at a spacing in parallel therewith, with respectively a web-shaped longitudinal support for the receipt of stator components or the like, including web-shaped cross-supports extending at right angles thereto, characterized in that each said cross-support (8) is constructed as a unitary web extending between the two side guiderails (4), which incorporates a cutout (10) in the crossing region with the longitudinal support (5) opening towards the edge of the cross-support (8), and wherein each said longitudinal support (5) is constructed comb-shaped and incorporates a cutout (9) in the crossing region with the cross-support (8) which is directed opposite to the cutout (10) in the cross-support (8), said cutouts (10) in the cross-supports (8) opening towards the lower free edge thereof, and the cutouts (9) of the longitudinal supports (5) opening towards the cover plate (3), the longitudinal support (5) contacting one of the two perpendicular side edges bounding the cutout (10) the cross-support (8), and being welded to said side edge, or the longitudinal supports (5) and the cross-supports (8) are interconnected at their crossing locations through threaded bolt connections (18), and fastening elements (11,13) for the stator components (6) or the like being welded or detachably attached to the lower edge of the longitudinal supports (5).

4,696,236

CONVEYOR APPARATUS

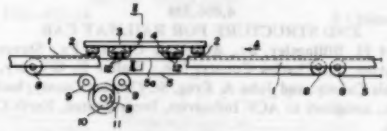
Hitoshi Kanayama, Sagamihara, Japan, assignor to Hokoku Chain Co., Ltd., Kanagawa, Japan

Filed May 28, 1985, Ser. No. 738,226

Claims priority, application Japan, Feb. 21, 1985, 60-33434

Int. Cl.⁴ B61B *13/12*

U.S. Cl. 104—165 **8 Claims**



1. A conveyor apparatus comprising:
rails laid at a predetermined interval in parallel with each other;
a truck movable by means of wheels on said rails;
a conveying belt moving in parallel with said rails;
a unit roller mechanism mounted on said truck and having two rollers rotatably supported on roller shafts and arranged longitudinally along the direction of said belt, said roller shafts being slidably inserted into two long slots of a holder plate which is mounted on said truck and which supports the roller shafts; and
means for pressing the rollers of said unit roller mechanism to said belt and in contact with each other;
whereby when the truck is stopped while the conveying belt continues to move, one of said rollers is caused to rotate, thereby causing the other roller to become separated from the conveying belt.

4,696,237

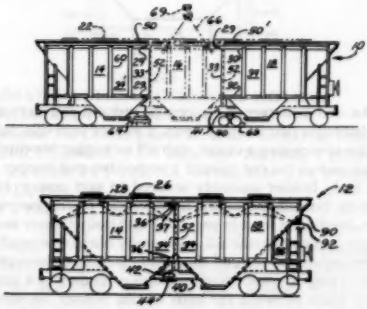
MULTIPLE HOPPER RAIL CAR WITH OFFSET VERTICAL WELD FROM CONVERSION

Roy W. Miller, Highland, Ind., assignor to Pullman Rail Leasing Incorporated, Chicago, Ill.

Filed Feb. 11, 1986, Ser. No. 828,415

Int. Cl.⁴ B61D *7/00*; B61F *1/08*

U.S. Cl. 105—248 **9 Claims**



1. A covered, dual hopper rail car having its two hopper sections joined by a common transverse central bulkhead, said hopper sections each having side portions formed by metal side sheets with the top and bottom portions of said side sheets being reinforced by an upper side plate and a lower side sill, respectively, said rail car being characterized in that said side sheets adjacent said transverse central bulkhead include a weld

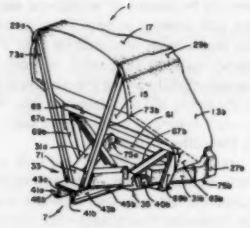
joint which has a first elongated intermediate portion which extends vertically in a first line between said upper side plate and said lower side sill, a pair of end portions which extend vertically in a pair of vertically spaced apart second lines which are also spaced from, and parallel to, said first line, said end portions extending only in the region of said upper side plate and said lower side sill, and a pair of horizontal portions extending along a third pair of lines which join each end of said intermediate portion to one of said end portions, said weld joint serving to reinforce and bond together the end hopper sections of a three hopper rail car from which the center hopper section was previously removed by being cut along said first, second and third lines.

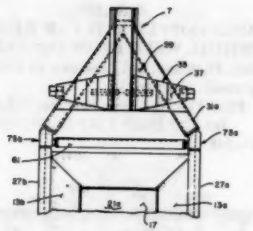
4,696,238

END STRUCTURE FOR RAILWAY CAR

Robert H. Billingsley, Jr., Allegheny County, Pa.; Steven L. Jantzen, St. Charles County, Mo.; Walter E. O'Leary, St. Louis County, and John A. Krug, St. Charles County, both of Mo., assignors to ACF Industries, Incorporated, Earth City, Mo.

Filed Oct. 28, 1985, Ser. No. 792,215
Int. Cl.[4] B61D *7/00, 17/00*
U.S. Cl. 105—248 **13 Claims**





8. An end structure for a center stub sill railway car, the latter having a pair of side sheets, a pair of side sills, said end structure comprising a center stub sill extending longitudinally from an end of the car toward a respective end hopper of the car, a body bolster assembly secured to said center stub sill, said body bolster extending transversely of the car, an end sheet extending at least in part over said body bolster assembly and over said center stub sill, a generally horizontal reinforcing member secured to the end sheet and extending transversely of the car, a pair of reinforcing members extending in a generally vertical plane between the ends of said bolster assembly and said horizontal reinforcing members, and a pair of diagonal reinforcement members extending between said bolster assembly and said horizontal reinforcing member, each said side sill having an end portion beginning generally at the lower portion of said end sheet and angling inwardly with respect to the longitudinal centerline of the car toward said center stub sill, said end portions being secured at one end to their respective side sills and being secured to their other or outer ends to said center stub sill, wherein said angled side sill end portions extend over said bolster assembly inwardly of said reinforcing members extending between said bolster assembly and said horizontal reinforcing member.

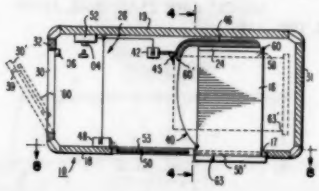
9. In a center stub sill railway car having a car body, a side sill secured to each side of said car body, the improvement comprising: an end structure assembly at each end of the car, each said end structure including a center stub sill, a tie plate secured to said center stub sill, but free of said side sills, each of said side sills extending longitudinally of the car body along the lower portions of said car body, a pair of side sill extensions, one for each of said side sills, extending inwardly form the end of a respective side sill toward said center stub sill for carrying all of the longitudinal loads between said side sills and said center stub sill, said side sill extensions being secured to said tie plate, and means for connecting each of said sill extensions to its respective side sill.

4,696,239

SECURITY ENCLOSURE FOR TRANSACTION MACHINE

A. William Trucksess, 451 Creek Rd., RD #2, Moorestown, N.J. 08057

Filed Apr. 18, 1985, Ser. No. 724,461
Int. Cl.[4] G07G *5/00*
U.S. Cl. 109—24.1 **15 Claims**



1. Security apparatus for a transaction processing machine comprising:

a walled enclosure;

and means for mounting a transaction processing machine within said enclosure;

said enclosure including means for providing user access through a wall of said enclosure to an operating interface of said machine,

said means for mounting including: (a) means for turning said machine about an axis within said enclosure to a position for service access within said enclosure at another portion of said machine, said axis being movable during turning, and (b) coupling means between said machine and said enclosure for guiding said axis to move transversely of itself during turning of said machine.

4,696,240

SAFETY CONTAINER

Heinz Maxeiner, Neu-Isenburg, Fed. Rep. of Germany, assignor to Bode-Panzer, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 819,394
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, 3507214
Int. Cl.[4] E04B *2/02*
U.S. Cl. 109—82 **5 Claims**

1. A lightweight safety container comprising at least one rigid wall having an outer layer of a metal alloy characterized by resistance to the heat of a cutting torch,

an inner metal layer,

said layers being interconnected in spaced relation by a series of spaced parallel ribs to form elongated channels between adjacent ribs, said ribs extending substantially the entire length of said wall,

said ribs being welded to said layers along their entire

length by practically linear welds, said welds projecting into grooves in the face of one of said layers,

bars of high thermal conductive metal disposed within and extending along the length of said channels, and bodies of drill resistant hardness embedded in said bars.

4,696,241

CANE BILLET PLANTER

Peter Morellini, P.O. Box 188, Ingham, Queensland, 4850, Australia

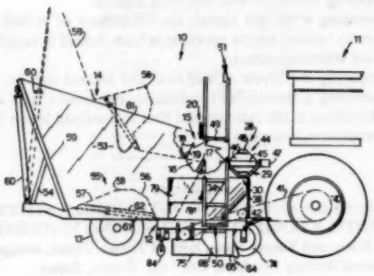
PCT No. PCT/AU85/00118, § 371 Date Feb. 3, 1986, § 102(e) Date Feb. 3, 1986, PCT Pub. No. WO85/05531, PCT Pub. Date Dec. 19, 1985

PCT Filed Jun. 3, 1985, Ser. No. 830,524

Claims priority, application Australia, Jun. 1, 1984, PG5349

Int. Cl.[4] A01C *11/00*

U.S. Cl. 111—3 **15 Claims**



1. Apparatus for planting elongate cane billets in planting furrows, said apparatus comprising a mobile frame assembly, an elongated hopper assembly on said frame assembly for receiving billets to be planted, a pair of conveyor means associated with said hopper assembly and arranged to receive billets therefrom, each said conveyor means including an endless chain having a run extending longitudinally of said hopper assembly, said chain runs being disposed adjacent, and extending substantially parallel to each other, a plurality of spaced apart billet engaging projections on each said chain, said projections extending upwardly from said chain runs and defining therebetween respective compartments for individual said billets, said billets when disposed in said compartments lying substantially parallel to said chain runs, and elongated divider between said chain runs and extending substantially parallel thereto, said divider extending upwardly to a height substantially the same as the height of said projections, drive means for said chains for driving the respective said runs of said chains in opposite directions so as to convey billets in said compartments to opposite sides of said apparatus, and means for receiving billets from said compartments and directing said billets into planting furrows.

4,696,242

SEWING MACHINE

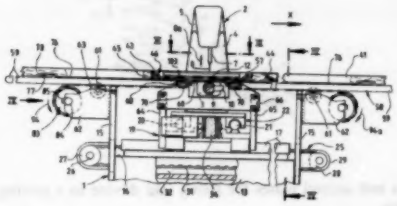
Hans Scholl, Oerlinghausen-Lipperreihe; Horst Thiele, and Eckhard Hägemann, both of Bielefeld, all of Fed. Rep. of Germany, assignors to Kochs Adler Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 18, 1986, Ser. No. 944,433

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1985, 3546238

Int. Cl.[4] D05B *21/00*

U.S. Cl. 112—121.14 **9 Claims**



1. Sewing machine controlled by a computer for producing a relative movement between a sewing head with a needle and at least one workpiece holder receiving a workpiece to be sewn during a sewing process in a plane substantially perpendicular to a direction of movement of the needle, whereby for producing said relative movement in two coordinate directions at right angles to one another servomotors controlled by said computer are provided for moving said sewing head relative to the at least one workpiece holder and whereby at the end of a sewing process the sewing head and the workpiece holder are brought into a position relative to one another in which the workpiece holder is free from the sewing head, wherein below the at least one workpiece holder is provided a supporting plate supporting the at least one workpiece holder and which supporting plate is fixed relative to said sewing head in one of said two coordinate directions and which supporting plate extends at least over the maximally possible relative movement in said one coordinate direction and which has a recess extending in the other one of said two coordinate directions for a passage of the needle.

4,696,243

PNEUMATIC ACTION ACCESSORY HOLDER SPECIFICALLY FOR SEWING MACHINES

Antonino Romano, Via Chiesa Nuova 22, 03039 Sora (FR), Italy

PCT No. PCT/IT85/00031, § 371 Date Apr. 29, 1986, § 102(e) Date Apr. 29, 1986, PCT Pub. No. WO86/01547, PCT Pub. Date Mar. 13, 1986

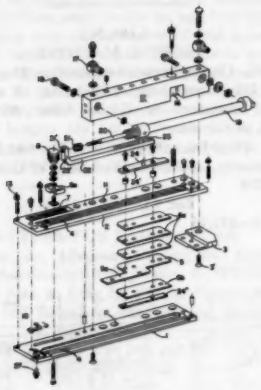
PCT Filed Aug. 28, 1985, Ser. No. 871,403

Int. Cl.[4] D05B *23/00, 75/00*

U.S. Cl. 112—257 **10 Claims**

1. A pneumatic action accessory holding device comprising first and second base plates, each base plate defining an elongated slot; a blade defining an accessory holder profiled plate positioned between said first and second plates and movable parallel to said slots; a distributor; means to mount said distributor on said first and second plates in different positions; a pneumatic cylinder mounted on said distributor to which fluid is fed from said distributor; a piston rod mounted within said pneumatic cylinder and having an end extending therefrom; a leg having an end connected to said extended end of said piston

rod and said blade; means for limiting the movement of the blade mounted on said first and second plates; and seats on said



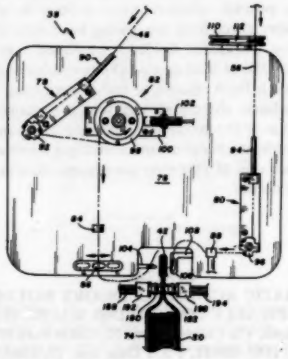
first and second plates for fixing said device to a sewing machine.

4,696,244

THREAD CHAINING DETECTOR

Mark E. Sampson, Cottage Grove, Minn., and Marvin E. Rosen, New Richmond, Wis., assignors to Doboy Packaging Machinery, Inc., New Richmond, Wis.

Filed Dec. 22, 1986, Ser. No. 944,875
Int. Cl.[4] D05B *13/02, 51/00*
U.S. Cl. 112—262.1 **24 Claims**



1. An apparatus for closing the open ends of pliant containers including:

a frame; a closing station mounted with respect to said frame; and a container transport means mounted to said frame for moving a plurality of pliant containers in succession past said closing station;

a first supply means mounted to said frame for continuously feeding a first closure material to said closing station, for the joinder of said first closure material with said containers at said open ends, to close said containers as they are moved past said closure station;

a first sensing means mounted with respect to said frame for generating a first signal having a first signal level which varies with the velocity of said container transport means;

a second sensing means mounted with respect to said frame for generating a second signal having a second signal level that varies with the speed at which said first closure material is moved from said supply means toward said closing station; and

comparator means, receiving said first and second signals as inputs for comparing said first and second levels and for providing a first fault indication whenever the ratio of said first and second levels deviates from a first predetermined normal range.

13. An apparatus for detecting the speed of thread as it is fed from a supply means to a sewing station, including:

a frame, a thread supply means mounted to the frame, and a sewing station mounted to the frame in spaced apart relation to the thread supply means;

an idler pulley mounted rotatably with respect to said frame along the path of said thread, and frictionally engaged with respect to the thread;

a first indicator element carried on said idler pulley, and a sensing means mounted with respect to said frame for registering a pulse each time said first indicator element passes proximate the sensing means, thereby to generate a velocity signal which varies with the rotational velocity of said idler pulley; and

a comparator means for comparing the level of said velocity signal with a reference signal level, and a fault indicator means for indicating a sensed deviation of said velocity signal level from a predetermined relation to said reference signal level.

21. A process for effecting a closure of the open ends of pliant containers, and for detecting a deviation from a desired amount of closure material employed in said closure, including the steps of:

transporting a pliant container past a stitching station using a container transport means;

generating a first signal, the level of which is directly related to the transport speed of said containers;

supplying thread to said stitching station;

generating a second signal, the frequency of which is directly related to the speed at which thread is supplied to said stitching station;

comparing the levels of said first and second signals; and

generating a thread fault indication responsive to a sensed deviation in the ratio of said first and second levels from a predetermined ratio.

4,696,245

METHOD OF AUTOMATIC BUTTONHOLE STITCHING WITH A COMPUTERIZED SEWING MACHINE

Kenji Kato, and Yasuro Sano, both of Tokyo, Japan, assignors to Janome Sewing Machine, Co. Ltd., Tokyo, Japan

Filed Aug. 14, 1985, Ser. No. 765,875
Claims priority, application Japan, Aug. 17, 1984, 59-170431
Int. Cl.[4] D05B *3/06*
U.S. Cl. 112—264.1 **4 Claims**

1. In a computerized sewing machine having means for selecting a cut width and amplitude of needle drops for left and right line tacks, and the electronic read only memory (ROM) and a random access memory (RAM), a method of automatically stitching buttonholes comprising the steps of

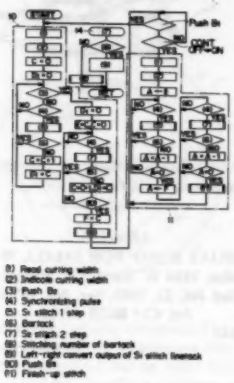
storing in the ROM basic data pertaining to initial amplitude values of a right line tack (RL) and/or a left line tack (LL) of a buttonhole, and initial amplitude coordinate values of an upper bar tack (UB) and/or lower bar tack (LB) pertaining to a present offsetting value (αx) of an initial cut width;

selecting a desired cut width and a desired amplitude of needle drops for buttonhole stitchings to be performed, and storing the selected data in the RAM:

computing the adjustment of amplitude coordinate values of said stored selected data relative to amplitude coordinates of stored basic data for offsetting in parallel the selected amplitudes of the needle drops for respective line tacks

relative to a standard center of a predetermined maximum amplitude, by amounts each corresponding to half the value of the selected cut width;

adjusting amplitude coordinate values of the bar tacks relative to the standard center in accordance with the selected cut width;



storing the adjusted amplitude coordinate values in the RAM; and

automatically stitching the buttonhole in accordance with the stored adjusted amplitude coordinate values.

4,696,246

DEVICE FOR DETECTING AN OVERLAPPING EDGE OF MATERIAL ON A SEWING MACHINE

Gustav Rohr, Heidelberg, and Gerd Nohl, Rauenberg, both of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH, Schwetzingen, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 868,790

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1985, 3519729

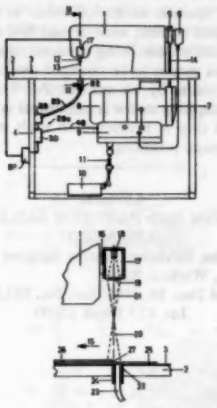
Int. Cl.[4] D05B *35/00*

U.S. Cl. 112—272 **20 Claims**

1. A device for detecting an overlapping edge of material on a sewing machine, comprising, in combination:

a signal-level discriminator having only one single electro-optic sensor responsive to light and a detector means electrically responsive to light sensed by the one electro-optic sensor for determining an absolute, light-intensity value of the sensed light; and

an optical waveguide having a light-receiving end on the sewing machine for receiving light through the overlapping edge of the material on the sewing machine and an end remote from the light-receiving end for providing the received light to the one electro-optic sensor of the signal-level discriminator.



4,696,247

FEED DEVICE FOR A SEWING MACHINE

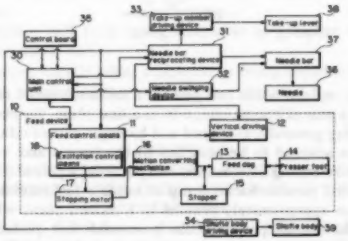
Fujio Horie, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Nov. 24, 1986, Ser. No. 934,000

Claims priority, application Japan, Dec. 16, 1985, 60-283286

Int. Cl.[4] D05B *27/22*

U.S. Cl. 112—315 **5 Claims**



5. A feed device for a sewing machine including an endwise reciprocatable needle and feed means having a feed dog and operative to impart a horizontal feed motion and a vertical feed motion to said feed dog in timed relation with the reciprocation of said needle; wherein feed means comprises,

a stepping motor operatively connected with said feed dog for said horizontal feed motion and having excitation modes as many as a predetermined number P, said stepping motor being capable of shifting by a unit amount S when the excitation mode thereof is changed over from one to the next,

a pair of stopper means disposed at a first and a second stoppage position corresponding to two limit positions defining the maximum range of said horizontal feed motion, and

feed control means for controlling said horizontal feed mo-

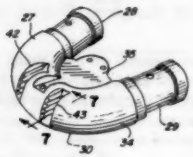
tion by sequentially changing over the excitation modes of said stepping motor in response to signals instructing the feed distance of said feed dog, said feed control means including excitation control means for alternately performing the changeover to a first specific excitation mode at the start of said horizontal feed motion and changeover to a second specific excitation mode at the end of said horizontal feed motion, each of said first and second specific excitation modes being predetermined from among the excitation modes to be changed over while said stepping motor shifts by an amount P·S/2 from a position where said stepping motor is positioned when the position of said feed dog is restricted to each of said first and second stoppage positions.

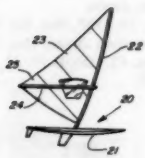
4,696,248

OUTHAUL BOOM END PART FOR SAILBOARD BOOM ASSEMBLY

Heinz F. Nedoluha, Salzburg, Austria, assignor to The Coleman Company, Inc., Wichita, Kans.

Filed Dec. 19, 1985, Ser. No. 811,022
Int. Cl.[4] B63B *15/00*
U.S. Cl. 114—39 **13 Claims**





1. An outhaul boom end part for a sailboard boom assembly having a pair of booms which lie in a first plane, the boom end part being generally U-shaped and having a pair of tubular end portions adapted to be attached to the booms and a central portion extending between the end portions, a pair of means on the central portion for securing an outhaul line extending in a direction approximately parallel to a second plane which bisects the booms perpendicularly to said first plane, and a sheave on the central portion having an axis which extends perpendicualarly to the plane of the U-shaped boom end part.

4,696,249

APPARATUS FOR ATTACHING SAIL-BOARD BOOM TO MAST

Michael W. Foy, 125 Lake Ave. W. #3, Kirkland, Wash. 98033

Filed Mar. 28, 1986, Ser. No. 845,839
Int. Cl.[4] B63B *15/00*
U.S. Cl. 114—99 **4 Claims**

1. Apparatus for attaching a sailboard boom to a sailboard mast comprising:

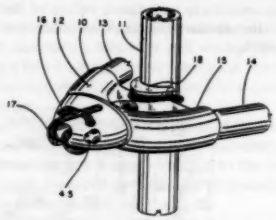
a first fixture integrated into said boom,

a length of line,

said first fixture having means for adapting it for attachment to said mast by said length of line with tension in said line,

said apparatus further comprising:

means for adjusting said tension in said line comprising a second fixture moveable relative to said first fixture,



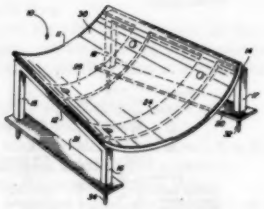
said tension being adjustable by motion of said second fixture relative to said first fixture.

4,696,250

PORTABLE BOAT RAMP FOR SMALL WATERCRAFT

John E. Antonides, 1834 W. Kerry La., Phoenix, Ariz. 85027

Filed Jul. 22, 1985, Ser. No. 757,482
Int. Cl.[4] B63B *17/00*
U.S. Cl. 114—343 **5 Claims**



1. A portable and temporary ramp for small watercraft for supporting the hull of a boat in a position out of contact with the waterbed, said ramp comprising:

(a) a frame having a front and rear having an opposite spaced-apart pair of rails generally forwardly inclined and convergent, said frame further including at least one transverse member extending between said rails forming a cradle, and legs depending from said rails at opposite ends thereof;

(b) protective means associated with said cradle defining a generally transversely curved saddle having an upper surface, said upper surface being substantially coextensive with said rails and extending substantially the length thereof and occupying substantially the entire area between said rails, said upper surface being substantially free of obstruction and generally forwardly inclined and converging and extending longitudinally a distance corresponding to a portion of the bow of the boat whereby boats of various hull sizes and configurations will seat in a supported position on said saddle out of contact with the waterbed;

(c) bearing pad means associated with the lower end of said leg means, said bearing pad means being generally perpendicular to said leg means and adapted to engage a surface area of the waterbed to distribute the load thereon and to stabilize the ramp in position on the waterbed; and

(d) ground engaging means extending from at least one of said bearing pad means for anchoring the ramp whereby said ramp can be conveniently stored as a unit in said boat and when desired, anchored in at least a partially submerged position to support a forward portion of the boat hull in an out-of-contact position with the waterbed.

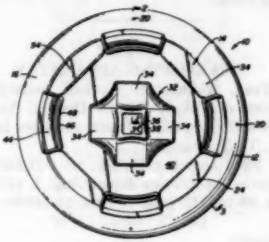
4,696,251
RAPID RIVER RIDE BOAT

Robert Spieldiener, Im Winkel 13, FL-9496 Balzers, Liechtenstein; Reinhold Spieldiener, Aussichtsstrasse 23, 8704 Herrliberg, and Alfons Saiko, Speerstrasse 26A, Oberrieden, both of Switzerland

Continuation of Ser. No. 585,124, Mar. 1, 1984, abandoned. This application Jul. 7, 1986, Ser. No. 882,505

Int. Cl.[4] B63B *3/00*

U.S. Cl. 114—346 5 Claims



1. A circular flotation vehicle constructed to uniformly seat a plurality of passengers for an amusement ride, comprising:

an annular deformable float and an inner substantially rigid inset with a circular flotation platform and a coupled passenger shell, the passenger shell having a central core with a plurality of integral fixed seats uniformly arranged in a single concentric course around the periphery of the core and with a raised center structure forming backrests for said seats, said substantially rigid inset being constructed with a concentric floor and a raised contoured outer rim which abuts the annular float, said inset being arranged to seat a plurality of passengers around the central core with the passengers'feet positioned on the floor or outer rim and the passengers' backs positioned against the raised structure of the core wherein the passengers face outward for improved visibility, safety and centralized location of aggregate passenger weight and wherein the outer rim of the inset has a raised splashguard portion in front of the seats and a low entry portion between the splashguard portions.

4,696,252
SIGNALLING DEVICE

Edward Grill, Box 562, Harlem, Mont. 59526

Filed May 30, 1986, Ser. No. 868,688

Int. Cl.[4] B64B *1/40*

U.S. Cl. 116—210 11 Claims

11. A unitized signal balloon device and package assembly for connection to a body of a user comprising:

a package including a casing for containing (1) a deflated and collapsed plastic type inflatable balloon, (2) a cartridge of compressed gas secured onto the casing, (3) a container with a length of monofilament tether line, one end of said tether line is secured on a portion of an anchor means on the balloon, said container being secured to said casing and including means for preventing tangling of the line, and (4) a set of several rolled aluminized MYLAR ® radar reflective streamers secured to another portion of the anchor means of the balloon,

the anchor means being formed at a lower extremity of the inflatable balloon and having an aperture accessing an elastomeric self-sealing end seal of the balloon,

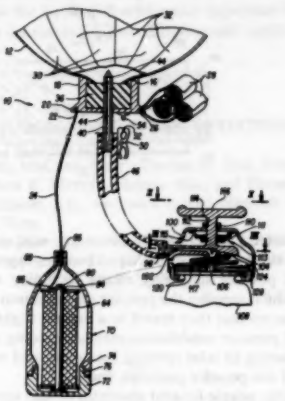
a releasable carrying element affixed to said casing for wrapping around a part of the body of the user said carrying element having VELCRO ® means for securing the carrying element to said part of the user's body,

a penetrating needle having an axial hollow passage, the penetrating needle piercing the elastomeric self-sealing end seal of the balloon, said penetrating needle and said elastomeric self-sealing end seal forming a quick release valve,

one end of a flexible hose communicating with the axial hollow passage and a second end of said hose communicating with a gas outlet conduit of an impact valve, a second penetrating needle centered over an end seal of the gas cartridge and located within said conduit of said impact valve which upon being forced toward and through the end seal of the gas cartridge permits said gas to pass into said balloon,

the impact valve constituting a non-freezing mechanism,

a spring release clamp affixed to one end of said flexible hose



for releaseably engaging a third portion of the anchor means for securing the balloon and,

the impact valve further including a slide means terminating in an impact handle for depressing and actuating the impact valve,

a safety pin for retaining the slide means in a locked open position until manually removed by the user,

the safety pin having a leather pull strap for grasping by the user,

the leather pull strap being adaptable to grasping by the user's teeth, and

the impact handle being adaptable to being depressed by a body member of the user such as a chin.

4,696,253
APPARATUS FOR APPLYING A STRIP-SHAPED POWDER LAYER ONTO A WELD SEAM OF CONTAINERS

Siegfried Frei, Schoeckstrasse 3, 9000 St. Gallen, and Ernst Hohl, Wittenbach, both of Switzerland, assignors to Siegfried Frei, St. Gallen, Switzerland

Division of Ser. No. 589,346, Mar. 14, 1984, Pat. No. 4,588,605. This application Mar. 26, 1986, Ser. No. 844,347

Claims priority, application Switzerland, Mar. 21, 1983, 1537/83

Int. Cl.[4] B05B *5/02, 13/06*

U.S. Cl. 118—308 5 Claims

1. An apparatus for forming and applying a substantially strip-shaped powder layer onto a weld seam of a can body, comprising:

spray head means including a spray chamber;

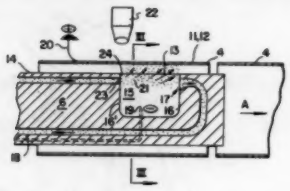
means for supplying a powder composed of powder particles transported by a carrier gas in the form of a substantially bundled powder jet into said spray chamber of said spray head;

said spray chamber being provided with a spray opening

which is open towards the weld seam and is located opposite the weld seam;

means for establishing a pressure in the spray chamber which is lower than the pressure of the surrounding atmosphere to ensure retention of the bundled powder jet entering said spray chamber and to prevent formation of a spray cloud of the powder particles of said bundled powder jet composed of the powder transported by the carrier gas;

means for diverting at least part of the powder particles of the bundled powder jet from the spray chamber in the direction of the weld seam and for depositing said diverted powder particles onto the weld seam in the form of a substantially strip-shaped powder layer;



said powder supplying means including a supply conduit which supplies the powder particles into said spray chamber so that they travel in a natural flight path;

said pressure establishing means including a suction conduit having an inlet opening located in said natural flight path of the powder particles; and

a spray nozzle located upstream of said spray chamber with respect to a predetermined direction of travel of the can body and arranged to supply the powder particles at an obtuse angle directly onto the weld seam.

4,696,254

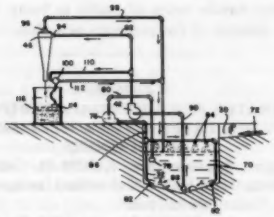
FLUID WASH SPRAY PAINT SYSTEM

Irvin Spindler, Princeton, Ind., assignor to George Koch Sons, Inc., Evansville, Ind.

Filed Jun. 11, 1986, Ser. No. 872,977

Int. Cl.[4] B05B *15/12*

U.S. Cl. 118—610 **6 Claims**



1. A fluid wash spray paint system comprising:

a plurality of paint spray booths, each booth including a fluid wash device to entrap paint overspray in a moving fluid to remove said overspray from said booth;

a sludge pit for collecting said fluid and entrapped paint overspray from the plurality of spray booths, said pit having a bottom section;

means for introducing a sludge-producing agent into said fluid and entrapped paint overspray to cause said paint to settle as sludge to said bottom section of said sludge pit;

centrifugal means for separating and removing said settled sludge from said fluid;

first means for circulating said fluid and sludge from said bottom section of said sludge pit through said centrifugal means and returning said fluid to said sludge pit;

second means for circulating said fluid from said sludge pit through said plurality of fluid wash spray devices;

means for agitating said fluid and said settled sludge located in said sludge pit to keep said sludge partially suspended in said fluid near said bottom section of said sludge pit, and

at least one spray nozzle located above said sludge pit and adapted to spray a portion of said circulating fluid and sludge onto the said fluid and sludge agitated by said agitating means.

4,696,255

DEVELOPING APPARATUS

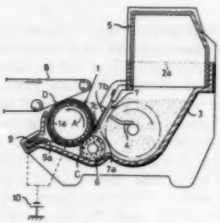
Hidetoshi Yano, Yokohama; Ryubun Seimiya; Noriyoshi Tarumi, both of Tokyo; Hiromi Demizu, Yokohama, and Makoto Obu, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 1, 1985, Ser. No. 761,610

Claims priority, application Japan, Aug. 7, 1984, 59-164246; Aug. 8, 1984, 59-166133; Aug. 9, 1984, 59-165584

Int. Cl.[4] G03G *15/08*

U.S. Cl. 118—653 **16 Claims**



1. A developing apparatus for supplying a thin layer of a developer to a latent image carrying member of a copying machine to develop a latent image on said latent image carrying member, comprising a storage means for storing said developer, a developer supply member rotatably supported for supplying said developer to said latent image carrying member, said developer supply member having a surface portion composed of an electrically insulative layer having minute, electrically floating, conductive regions dispersed therein, a developer feeding member disposed rotatably between said storage means and said developer supply means and being in contact with said developer supply means for feeding said developer from said storage means to said developer supply means, and a layer thickness regulating member having a portion in pressure contact with said surface portion of said developer supply member for regulating the thickness of said thin layer of said developer on said developer supply member.

4,696,256

APPARATUS FOR THE PRODUCTION OF MULTIPLE LAYER GLASS SHEETS WITH PLASTIC SEALS

Karl Lenhardt, Neuhausen-Hamberg, Fed. Rep. of Germany, assignor to Saint-Gobain Vitrage, Courbevoie, France

Filed Aug. 22, 1985, Ser. No. 768,220

Claims priority, application France, Aug. 22, 1984, 84 13088; Sep. 17, 1984, 84 14185; Sep. 17, 1984, 84 14186

Int. Cl.[4] B05C *5/02*

U.S. Cl. 118—680 **20 Claims**

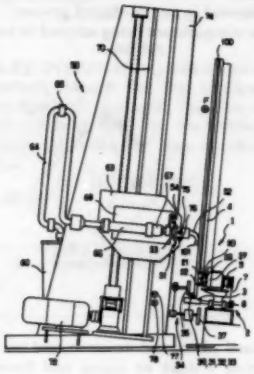
1. An apparatus for applying a butyl rubber base plastic bead onto a face of a glass sheet, comprising:

a panel having a substantially vertical surface for supporting a glass sheet;

first conveyor means for linearly moving said glass sheet supported by said panel in two senses of a first direction;

extrusion means having an extrusion nozzle positionable

adjacent said face of said glass sheet supported by said panel; and



means for linearly moving said nozzle in a second direction parallel to said face of said glass sheet supported by said panel.

4,696,257

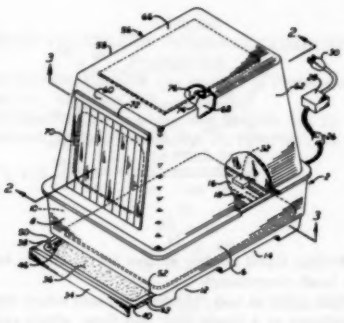
SELF DRYING PET LITTER BOX

John F. Neary, 7540 34th St., St. Petersburg, Fla. 33711; John T. Peddy, Clearwater, and David H. Willis, Largo, both of Fla., assignors to John F. Neary, St. Petersburg, Fla.

Continuation-in-part of Ser. No. 771,519, Aug. 30, 1985, Pat. No. 4,649,862. This application Aug. 20, 1986, Ser. No. 896,680

Int. Cl.[4] A01K *29/00*

U.S. Cl. 119—1 **20 Claims**



1. A self-drying pet litter box for controlling odors by destroying bacteria comprising

a box-like container having upwardly extended sides with at least one aperture through a lower portion of at least one of said sides, whereby air may pass through the aperture from points exterior to the container to the interior of the container,

a foraminous panel received within said container and having at least one substantially flat surface, said panel extending substantially continuously between said container sides with the apertures through said panel being distributed across substantially the entire panel, and

means for supporting said panel generally horizontally and spaced above the lowermost portion of said container sides with said substantially flat surface panel facing upwardly to support particulate litter material placed thereupon and another surface of said panel facing downward, whereby exterior air may enter the litter box through the apertures in the panel to dry the particulate litter material placed thereupon;

means for applying heat to said panel, whereby liquid and solid waste material deposited by an animal upon the particulate litter material supported by the panel may be heated;

means both for selectively controlling said application of heat to said panel such that the temperatures of said panel and of the litter material supported thereupon are raised to predetermined levels and maintained at those levels for a time sufficient to destroy bacteria and viruses residing upon said panel and upon the particulate litter material and carried by the liquid and solid waste deposited thereupon and also for thereafter discontinuing said application of heat.

4,696,258

METHOD AND SUBSTANCE FOR THE DETECTION OF COWS IN ESTRUS

Joseph M. Magrath, McCook, Nebr.; Thomas R. Tice, Birmingham, Ala.; William E. Meyers, Helena, Ala., and Thomas O. Dappert, Birmingham, Ala., assignors to The Magrath Company, McCook, Nebr.

Continuation-in-part of Ser. No. 595,625, Apr. 4, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 821,219

Int. Cl.[4] A01K *29/00*

U.S. Cl. 119—1 **17 Claims**

14. A coating material for location on an area of the body of an animal for detecting the application of pressure to such area during mounting by another animal, said material comprising a body of liquid having therein a mass of very small frangible capsules, each capsule containing a liquid dye, said material when spread over a surface drying and setting to provide a layer of said capsules on the surface, when said layer has been provided on a surface positioned in said area of the body of an animal, pressure against said surface for a predetermined period of time of the order of five seconds will break at least a subsatantial portion of the capsules and impart the color of said dye to said surface and thereby provide a visual indication that pressure of the order of that present between cattle during mounting has been applied to said area of the animal for at least said period of time.

4,696,259

ENCLOSURE AND HOUSING FACILITY FOR AN ANIMAL

Cary M. Fewox, Mulberry, Fla., assignor to C&M Custom and Portable Kennels, Inc., Mulberry, Fla.

Filed Nov. 21, 1985, Ser. No. 800,249

Int. Cl.[4] A01K *1/02*

U.S. Cl. 119—19 **13 Claims**

1. A housing assembly for an animal of the type primarily designed to enclose and provide shelter, said assembly comprising:

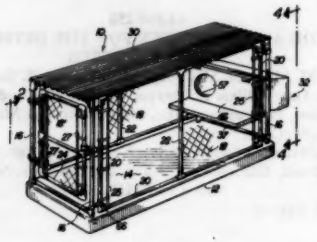
(a) a base including an exposed support surface disposed and structured to support an animal thereon,

(b) enclosure means mounted in substantially surrounding relation to said base for containment of the animal thereon, said enclosure means extending upwardly relative to said support surface,

(c) said enclosure means including a wall portion configured to at least partially surround and define an enclosure interior, a cover connected to said wall portion and disposed in spaced, overlying relation to said support surface of said base and in substantially covering relation to an animal contained on said support surface,

(d) a housing mounted on said enclosure means in spaced relation above said support surface and distanced therefrom sufficient to allow access thereto by the animal contained within said enclosure means,

(e) said wall portion including an open mesh construction extending substantially from said support surface of said



base upwardly to at least said housing and in surrounding relation to said enclosure interior,

(f) said housing including an entrance positioned in accessible relation to said enclosure interior, said housing dimensioned and structured to house the animal within a housing interior of said housing in shielded, protected relation to harsh weather conditions,

(g) said housing including a support platform disposed adjacent and beneath said entrance in substantially parallel relation to said support surface of said based, said support platform projecting outwardly from said entrance into said enclosure interior and being disposed and structured to support an animal theron, and said base made from a rigid, substantially lightweight material and said enclosure means and said housing interconnected in supported relation thereon, each of said enclosure means, base and housing collectively structured as a dependent unit and selectively movable to anyone of a variety of locations.

4,696,260

ANIMAL SHELTER

Joseph Panessidi, 10835 Monticello, Pinckney, Mich. 48169

Filed Jul. 24, 1985, Ser. No. 758,257

Int. Cl.[4] A01K *1/03*

U.S. Cl. 119—19 **17 Claims**

1. A shelter for an animal, comprising:

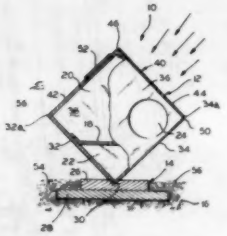
a base member adapted to support said shelter in a fixed position relative to the ground;

a substantially enclosed structure mounted on said base member, said structure including a generally horizontal floor for supporting said animal within said structure, said floor dividing said structure into an upper compartment and a lower compartment;

said base member being generally rectangular in shape, said base member including an upper portion adapted to support said structure and a lower portion adapted to be disposed below the surface of the ground, said lower portion having a greater width than said upper portion;

said upper portion of said base member including an upwardly facing, longitudinally extending V-shaped groove, said structure being generally cube-shaped and including two sides intersecting at substantially the same angle as the angle defined by said groove, said structure being mounted on said base member with said two intersecting sides disposed in said V-shaped groove;

said upper compartment being adapted to house and protect



said animal within said structure, said lower compartment comprising a dead air space, said lower compartment being disposed substantially entirely above the ground; and

an opening in said structure providing means of ingress and egress for said animal relative to said upper compartment.

4,696,261

COOLANT LEVEL SENSOR ARRANGEMENT IN BOILING LIQUID COOLING SYSTEM

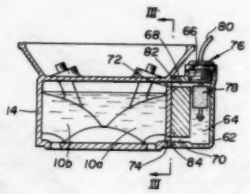
Yoshimasa Hayashi, Kamakura, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 699,315, Feb. 7, 1985, abandoned. This application Aug. 7, 1986, Ser. No. 894,090

Claims priority, application Japan, Feb. 21, 1984, 59-23459[U]

Int. Cl.[4] F01P *3/22*

U.S. Cl. 123—41.21 **6 Claims**



1. A boiling liquid cooling system for an engine having a cylinder head, comprising:

a coolant jacket in said cylinder head into which coolant is introduced in a liquid state and from which coolant is discharged in a gaseous state;

means for condensing the gaseous coolant from said coolant jacket into condensed liquid coolant;

a pump for pumping said condensing liquid coolant into the coolant jacket of the cylinder head when energized;

a separate chamber member directly connected to said cylinder head, said chamber member having two ports respectively connected with two ports formed in said cylinder head, the interior of said chamber member thereby being in fluid communication with the coolant jacket of the cylinder head so as to be in heat transfer communication with said cylinder head, said chamber member containing therein liquid coolant at substantially the same level as in said coolant jacket, said chamber member thereby providing means for isolating the liquid coolant therein from transient liquid level variations in said jacket due to boiling of said liquid coolant in said jacket; and

a level sensor mounted in said separate chamber member to detect the level of liquid coolant in the chamber member and thereby to control operation of said pump in accordance with the level.

4,696,262

AIR-COOLED INTERNAL COMBUSTION ENGINE

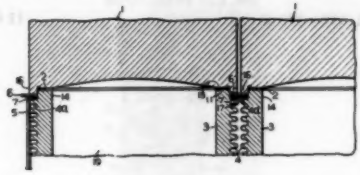
Martin Roggendorff, Cologne, Fed. Rep. of Germany, assignor to Kloeckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 820,941

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502668

Int. Cl.⁴ F01P *1/02*

U.S. Cl. 123—41.69 **13 Claims**



1. In an air-cooled internal combustion engine having at least one cylinder unit including a cylinder and a cylinder head on top of and in a sealing juncture with the cylinder, means for conducting cooling air past the cylinders of the engine to facilitate its use as heating air including a generally flat partition near the plane of said sealing juncture between said cylinder head and said cylinder, said partition being gas-tight sealing engagement with said cylinder independently of said sealing juncture whereby cooling air flowing beneath said partition and past said cylinder will not be contaminated by combustion gases leaking from said sealing juncture between said cylinder and said cylinder head.

4,696,263

REED VALVES FOR INTERNAL COMBUSTION ENGINES

Eyvind Boyesen, Kempton, Pa., assignor to Performance Industries, Inc., Kempton, Pa.

Continuation-in-part of Ser. No. 754,243, Jul. 12, 1985, abandoned. This application Sep. 25, 1986, Ser. No. 911,485

Int. Cl.⁴ F02B *75/02*

U.S. Cl. 123—65 V **9 Claims**

1. A two-cycle engine comprising a cylinder, a piston working in the cylinder, the engine having a compression chamber below the piston, a fuel intake system including a ported valve seat for delivering fuel into the compression chamber, the cylinder having an exhaust port and a transfer passage for delivering compressed fuel from the compression chamber to the space above the piston, and a reed valve overlying the port in the valve seat and adapted to flex away from the ported seat during the upward stroke of the piston, the reed valve being of multiple layer construction with an outlet layer formed of relatively rigid resin material and an inner layer presented inwardly for contact with the valve seat and formed of relatively flexible temperature-resistant synthetic rubber material, the rubber layer being thinner than the resin layer and the resin and rubber layers being adhesively bonded to each other.

4,696,264

TWO-STROKE ENGINE

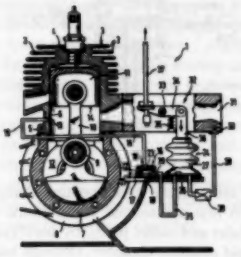
Werner Vondernau, Backnang-Waldrems; Jürgen Weber, Kernen-Rommelshausen; Hans Nickel, Cottenweiler; Michael Wissmann, Schorndorf-Weiler, and Harald Schliemann, Waiblingen, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 704,083, Feb. 21, 1985, Pat. No. 4,590,896. This application Aug. 9, 1985, Ser. No. 764,220

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509540

Int. Cl.⁴ F02B *33/04*

U.S. Cl. 123—73 V **9 Claims**



1. A two-stroke engine equipped with a control device to control an operating condition of the engine, the engine comprising:

a crankcase subjected to continuously alternating underpressure and overpressure conditions;

an output actuator connected to said control device for adjusting said operating condition;

pneumatic actuating means responsive to a change in pressure therein for acting on said output actuator so as to cause the latter to adjust said control device to control said operating condition;

pressure connecting means for connecting said pneumatic actuating means to said crankcase; and,

resonance valve means connected into said pressure connecting means for opening the latter in response to a predetermined resonance frequency thereby subjecting said pneumatic actuating means to one of said pressure conditions and causing a pressure change therein.

4,696,265

DEVICE FOR VARYING A VALVE TIMING AND LIFT FOR AN INTERNAL COMBUSTION ENGINE

Hidetaka Nohira, Mishima, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Dec. 26, 1985, Ser. No. 813,555

Claims priority, application Japan, Dec. 27, 1984, 59-274001

Int. Cl.⁴ F01L *1/24, 1/34*

U.S. Cl. 123—90.16 **10 Claims**

1. A device for varying valve timing and lift comprising:

a first valve lifter movable along an axis and adapted to contact a valve;

a second valve lifter, adapted to contact a cam, movable along ssaid axis, said first and second valve lifters defining a pressure chamber therebetween;

first means for providing a pressure in said pressure chamber, a sole source of pressure to said pressure chamber being by supplying oil to an inlet portion of said pressure chamber; and

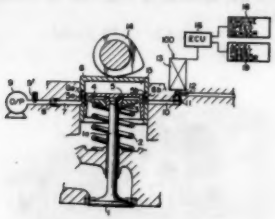
second means, coupled to an outlet portion different from said inlet portion, of said pressure chamber, for selectively relieving pressure in said pressure chamber; and

high speed actuator means for controlling said pressure relieving of said second means, including: check ball valve means for selectively blocking said second means, and actuator means for directly opening said check ball valve means, said check ball valve means disposed so that pressure of said oil closes said check ball valve means.

8. A method of controlling a valve, comprising the steps of:

transferring motion from a cam to a first valve lifter;

transferring motion from a second valve lifter to said valve;



controlling the volume of a pressure chamber defined between said first and second valve lifters which has independent inlet and outlet paths, by supplying a pressurized oil into said pressure chamber, through said inlet path and selectively commanding a check ball valve in said outlet path to open against said oil pressure, said check ball valve disposed so that said oil pressure would normally close said check ball valve;

selectively opening said check ball valve by transmitting force from an actuator to said check ball valve;

using only said oil pressure as controlled by said check ball valve to apply a force to said second valve lifter.

4,696,266

DECOMPRESSION APPARATUS FOR ENGINES

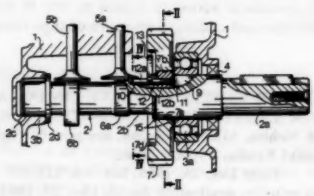
Mitsuyoshi Harada, Gyoda, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1986, Ser. No. 879,645

Claims priority, application Japan, Jul. 5, 1985, 60-102524

Int. Cl.⁴ F01L *13/08*

U.S. Cl. 123—182 **4 Claims**



1. In a decompression apparatus for an engine having a camshaft, a cam gear having a longitudinal bore along a central axis thereof, and a tappet engaging with an actuating cam on the camshaft, the improvement comprising:

a releasing lever comprising a shaft and a weight secured to the shaft;

the shaft forming a semicircular cam at one end;

the camshaft having a first recess in a longitudinal direction;

the cam gear having a second recess adjacent the bore;

a bearing member for engaging with the first and second recesses and for rotatably supporting the shaft;

a flat bottom notch for supporting said semicircular cam and being provided on the camshaft close to the actuating cam; and

the semicircular cam being arranged to project beyond a periphery of the actuating cam when engine operation is stopped.

4,696,267

CYLINDER BLOCK STRUCTURE FOR INTERNAL COMBUSTION ENGINE

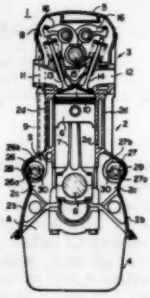
Kouji Kohno; Hiroichi Takubo, and Toshinobu Ito, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Oct. 23, 1985, Ser. No. 790,508

Claims priority, application Japan, Oct. 27, 1984, 59-226139; Oct. 27, 1984, 59-226140

Int. Cl.⁴ F02B *75/06*

U.S. Cl. 123—192 B **11 Claims**



1. A cylinder block structure for an internal combustion engine having a top part on which a cylinder head defining a head chamber with a cylinder-head cover mounted thereon is to be mounted, a lower part on which an oil pan is to be mounted, a plurality of cylinder bores in which pistons are to be inserted, and partition walls which are provided between adjacent cylinder bores to support a crank-shaft, wherein the improvement comprises a balancer case which is formed on a side wall of the cylinder block integrally therewith to accommodate therein a balance shaft which is provided with a balance weight and is operatively connected to the crankshaft to be driven thereby, and a blowbly passage which communicates between an interior of a crankcase in the cylinder block and the head chamber defined by said cylinder head and the cylinder-head cover to be mounted thereon, the interior of the balancer case forming a part of the blowby passage, wherein said balancer case is formed at a position higher than the position where the crankshaft is supported, wherein said balancer case extends through said partition walls between said cylinders and wherein said blowby passage communicating with said head chamber opens to the balancer case in one of said partition walls.

4,696,268

ROTARY PISTON INTERNAL COMBUSTION ENGINE WITH WATER INJECTION

Otto Zimmermann, Lehenweg 4, Hard, Austria (6971)

Filed Jun. 13, 1985, Ser. No. 745,243

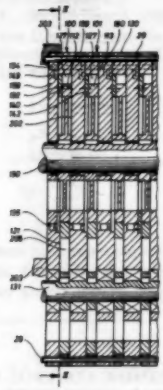
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1984, 3422487

Int. Cl.⁴ F02B *53/00*

U.S. Cl. 123—203 **10 Claims**

1. A rotary piston machine of a combustion motor having pistons on rotating piston rotors and associated circular working chambers each defined circumferentially behind an associated piston in a direction of rotation of the associated rotor, the piston rotors attached to a shaft and each piston aligned for mating engagement with a recess in at least one shut-off rotor

engaging circumferentially a respective piston rotor, the shaft of the piston rotors and a shaft of the shut-off rotor interconnected by coupling gears, rotary valves connected with the shaft of the piston rotors in order to effect admission and discharge of a fuel mixture for the working chambers, the fuel mixture being injected in each working chamber and ignition causing an expansion phase therein of the fuel mixture, and in each working chamber injection of water being provided during the expansion phase characterized in that the machine includes four water injection nozzles, a first of said nozzles is positioned circumferentially at a location corresponding to the



position of the piston near the beginning of the expansion phase, and a second of said nozzles is positioned circumferentially at a location corresponding to the position of the piston near the end of the expansion phase, such that each of the first two water injection nozzles injects water following movement of the respective piston past each of the first two water injection nozzles, and the other two water injection nozzles are positioned circumferentially downstream of the first two water injection nozzles in the direction of rotor rotation to inject water before movement of the respective piston past the other two water injection nozzles.

4,696,269

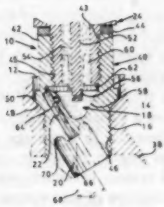
DEVICE FOR IMPROVING THE IGNITION OF FUEL-AIR MIXTURES IN INTERNAL COMBUSTION ENGINES

Donald Blackburn, Roane County, Tenn., assignor to Oak Ridge Systems, Inc., Oak Ridge, Tenn.

Continuation-in-part of Ser. No. 806,678, Dec. 9, 1985, Pat. No. 4,646,695. This application Jan. 23, 1987, Ser. No. 6,103

Int. Cl.[4] F02B *19/16, 19/18*

U.S. Cl. 123—256 **20 Claims**



1. A flame ignitor for internal combustion engines for achieving self-regulation of ignition timing, improved fuel economy, and substantial elimination of combustion knock, which comprises:

a body member extending from exterior of such engine to a cylindrical combustion chamber of such engine, said body member being provided with a bore having a first end proximate an outer surface of such engine and a second end proximate an ignition region of said combustion chamber, said first end of said bore adapted to receive a spark producing device, said second end of said bore having an axis aligned at a selected angle, θ, to an axis of said combustion chamber;

a barrier wall positioned within said bore dividing said bore into a primary ignition chamber proximate said first end for surrounding said spark producing device and a secondary ignition chamber proximate said second end, said barrier wall being provided with a channel providing communication between said primary ignition chamber and said secondary ignition chamber, said primary chamber being provided with extended passageways for retarding a flame front exiting said primary chamber and thus regulating the velocity of a flame exiting said secondary ignition chamber as a function of pressure within said primary ignition chamber for achieving timing delay according to engine speed to substantially prevent combustion knock and improve fuel economy; and

wherein said angle, θ, is selected for directing said axis of said second end of said bore toward a region of fuel-rich mixture within said combustion chamber above a piston head within said combustion chamber.

4,696,270

COMBUSTION PROCESS FOR INTERNAL COMBUSTION ENGINE

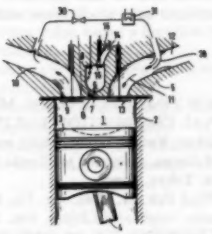
Franz Pischinger, Aachen, Fed. Rep. of Germany, assignor to FEV Forschungsgesellschaft für Energietechnik und Verbrennungsmotoren mbH, Aachen, Fed. Rep. of Germany

Filed Feb. 24, 1986, Ser. No. 832,435

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1985, 3506217

Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—274 **2 Claims**



1. A combustion process for a compression ignition internal combustion engine having a main combustion chamber and at least one precombustion chamber connected with said combustion chamber by at least one opening, introducing at least a fuel into said precombustion chamber, separately introducing fuel, air and recirculated exhaust gas directly into said combustion chamber for producing an admixture therein, and igniting said admixture, providing a 3-way catalyst connected to the flow of exhaust gas from said combustion chamber, and measuring the oxygen content of the exhaust gas entering said catalyst for regulating the ratio of fuel and air entering said combustion and pre-combustion chambers in a nearly stoichiometric range.

4,696,271

FUEL INJECTION PUMP

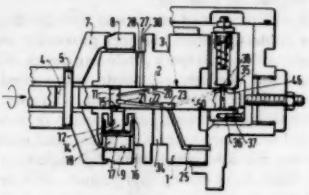
Jean LeBlanc, Lyons, France, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 690,976, Jan. 11, 1985, abandoned. This application May 9, 1986, Ser. No. 861,307

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1984, 3400612; Dec. 5, 1984, 3444234

Int. Cl.[4] F02M 41/06

U.S. Cl. 123—299 14 Claims



1. A fuel injection pump for internal combustion engines, comprising at least one pumping piston delimiting a variable work space, connecting means rotating in synchronism with said pumping piston to connect the work space during each delivery stroke to a fuel injection conduit and during each suction stroke to a fuel storage space, means for adjusting the axial position of said connecting means relative to said fuel injection conduit and said fuel storage space according to a desired duration of main fuel injection; means for varying strokes of said pumping piston according to a desired duration of preliminary fuel injection; a fuel offtake device including a fuel offtake space provided with an access channel, a movable wall for varying the volume of said fuel offtake space, biasing means for displacing said movable wall toward said access channel into a limit position in which said fuel offtake space has a minimum volume, abutment means for limiting the movement of said movable wall in the direction away from said access channel, said connecting means including at least one control passage for connecting, from a predetermined position of the pumping piston during each delivery stroke, the work space of the pump with said access channel; and means for adjusting the position of said fuel offtake device relative to said connecting means whereby fuel delivered after a partial pumping stroke which is variable according to predetermined operational parameters, acts on said movable wall to establish a connection between said work space and said variable fuel offtake space.

4,696,272

IGNITION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES AT IDLE

Akira Kato, Tokyo; Yutaka Otobe, Shiki, and Shigehiro Kimura, Niiza, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

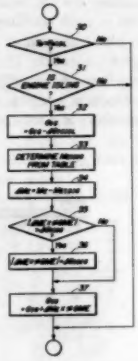
Filed Feb. 21, 1986, Ser. No. 832,246

Claims priority, application Japan, Feb. 22, 1985, 60-032563; Feb. 22, 1985, 60-032564; Feb. 22, 1985, 60-032565

Int. Cl.[4] F02M 3/00

U.S. Cl. 123—339 17 Claims

1. A method of controlling the timing of ignition of a mixture being supplied to an internal combustion engine on the basis of an ignition timing value determined in response to operating conditions of said engine, the method comprising the steps of: (1) determining whether or not said engine is in a predetermined idling region; (2) determining whether or not a temperature of said engine is above a predetermined value; (3) retarding the determined ignition timing value by a predetermined amount when said engine is determined to be in said predetermined idling region and the engine temperature is determined to be above said predetermined value; (4) setting a desired idling speed in response to operating conditions of said engine; (5) calculating a correction value by multiplying the difference between the set desired idling speed and actual engine speed by a predetermined coefficient; (6) correcting the ignition timing



value retarded by the predetermined amount at the step (3), by said correction value thus calculated; and (7) controlling the ignition timing to said ignition timing value thus corrected.

4,696,273

IGNITION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

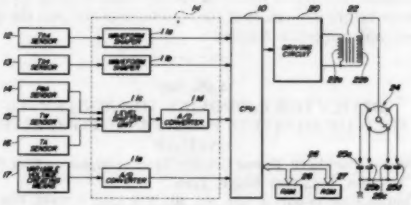
Yutaka Otobe, Shiki; Yoshio Suzuki, Wakoh; Shigehiro Kimura, Niiza, and Naoki Ohsawa, Wakoh, all of Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed May 22, 1986, Ser. No. 866,462

Claims priority, application Japan, May 27, 1985, 60-113762; May 31, 1985, 60-117967

Int. Cl.[4] F02P 5/04

U.S. Cl. 123—417 10 Claims



1. An ignition timing control method for an internal combustion engine wherein ignition timing of the engine is controlled in response to operating conditions of the engine to appropriate values for the operating conditions of the engine, based upon advance angle control data read from memory means in which they are stored, the method comprising the steps of:

(1) storing beforehand a plurality of correction values as a function of the rotational speed of the engine and an output voltage from a variable voltage creating means which is humanly adjustable to a voltage value appropriate to each individual engine from the outside of an ignition timing control system to which said method is applied, after mass production of said system;

(2) detecting said output voltage from said variable voltage creating means;

(3) detecting the rotational speed of the engine;

(4) reading one of said correction values, which corresponds

to the detected output voltage and the detected rotational speed of the engine; and

(5) arithmetically correcting the ignition timing which is determined beforehand in response to operating conditions of the engine, by the use of said read one correction value.

4,696,274

FUEL INJECTION CONTROL FOR INTERNAL COMBUSTION ENGINE

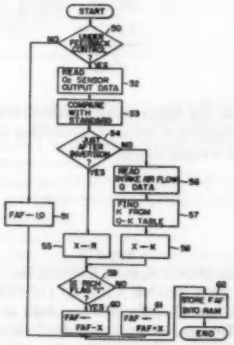
Kunihiko Sato, Okazaki, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 689,815, Jan. 8, 1985, abandoned. This application Jun. 25, 1986, Ser. No. 880,348

Claims priority, application Japan, Aug. 7, 1984, 59-164189

Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—440 **3 Claims**



1. A fuel injection control apparatus for an internal combustion engine comprising:

means for detecting a concentration of a specific component of an engine exhaust gas;

means for calculating at predetermined intervals of time an air-fuel ratio feedback correction coefficient in accordance with the detected concentration of the specific component, said calculating means including means for integrating the detected concentration of the specific component with respect to time by using an integration constant;

means for detecting an intake air flow of the engine; and

means for selecting the integration constant, in accordance with the detected intake air flow, so that at least the envelope of a correction signal based on a plurality of feedback correction coefficients has an amplitude that is constant even if the intake air flow rate is changed.

4,696,275

FUEL INJECTION METHOD AND DEVICE PROVIDING SIMPLE ATMOSPHERIC PRESSURE COMPENSATION FOR ENGINE INCORPORATING OPEN TO ATMOSPHERE FUEL PRESSURE REGULATOR VALVE

Naoto Kushi; Hiroshi Okano; Nobuyuki Kobayashi, and Naoki Sugita, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Dec. 6, 1985, Ser. No. 805,902

Claims priority, application Japan, Feb. 5, 1985, 60-020729; Mar. 13, 1985, 60-049553

Int. Cl.[4] F02D *41/32*

U.S. Cl. 123—478 **2 Claims**

1. A device for fuel injection in an internal combustion engine which has an intake system, comprising:

(a) fuel injector means, fitted to said intake system for injecting fuel into said intake system according to an opening and closing of said fuel injector means;

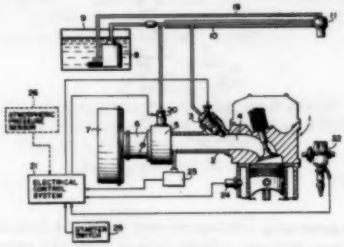
(b) means for supplying pressurized fuel to said fuel injector means;

(c) means for controlling a pressure difference between a pressure of said pressurized fuel which is supplied to said fuel injector means and a current value of atmospheric pressure to be substantially equal to a determinate value;

(d) means for calculating an actual fuel injection time interval by:

(1) determining a basic time interval for fuel injection, according to engine operational parameters and a certain atmosphere pressure;

(2) if the current value of atmospheric pressure is higher than said certain atmospheric pressure value, then applying a reduction correction amount which decreases said basic fuel injection time interval to said basic fuel injection time interval, to derive said actual fuel injection time interval; and



(3) if the current value of atmospheric pressure is not higher than said certain atmospheric pressure, then applying an increase correction amount which has an absolute value that diminishes as the absolute value of the pressure in said intake system diminishes to said basic fuel injection time interval, to derive said actual fuel injection time interval; and

said correction amount being determined by multiplying the basic fuel injection time interval by a correction coefficient;

said correction coefficient being determined by adding, to the product of a first correction value and a second correction value, a third correction value;

said first correction value being a function only of intake system pressure;

said second correction value being a function only of ambient atmospheric pressure; and

and said third correction value being a function only of ambient atmospheric pressure; and

(e) means for controlling said fuel injection means to be open for substantially said actual fuel injection time interval.

4,696,276

METHOD FOR INFLUENCING THE METERING OF FUEL TO AN INTERNAL COMBUSTION ENGINE

Ulrich Flaig, Markgröningen, and Albrecht Sieber, Ludwigsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 839,896

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1985, 3510216

Int. Cl.[4] F02M *51/00*

U.S. Cl. 123—478 **10 Claims**

1. A method for controlling the metering of fuel to an internal combustion engine as a function of at least one of the revolutions of the engine and the working strokes of the engine, using a first means for measuring a quantity (LZ) representing one of said revolutions of the engine and said working strokes

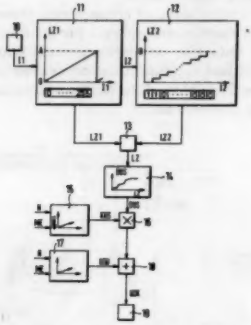
of the engine as engine elapsed operating time, said method comprising the steps of:

(1) memorizing said (LZ) quantity with a volatile storage second means (11) between the values of (0) and (A), with (LZ1) representing the non-volatile storage value between (0) and (A);

(2) resetting (LZ1) to (0) when said (A) value is reached;

(3) transferring said (A) value to a non-volatile storage third means (12) each time said (A) value is reached;

(4) compounding said non-volatile storage value (A) up to a predetermined quantity (B);



(5) generating a drift-correction signal (DUS) in dependence upon said non-volatile storage value (B) represented by (LZ2);

(6) developing an aging characteristic field (14) from input signal LZ which satisfies the relationship

$$LZ = LZ1 + LZ2 \times A;$$

and,

(7correcting speed (15) and pump (17) characteristic fields with said drift correction signal (DUS) to provide the proper metering to injector (19).

4,696,277

ENGINE ALARM SYSTEM

Takeshi Katayama, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 3, 1986, Ser. No. 926,175

Claims priority, application Japan, Nov. 4, 1985, 60-247604

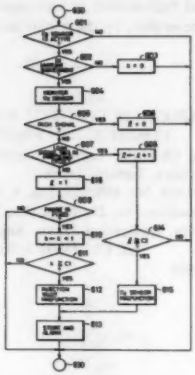
Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—479 **10 Claims**

1. In an electronic engine control system which performs at least fuel injection control of an engine via fuel injection valves in response to control signals which are derived from output signals of sensors detecting operating conditions of the engine and from an output signal of an air-to-fuel ratio sensor disposed in an exhaust system of the engine in accordance with a program stored in a microcomputer, an alarm system comprising:

(a) first means for detecting when the fuel injection control is being operative to supply the engine with a rich air-fuel mixture;

(b) second means for detecting whether or not the air-to-fuel ratio sensor periodically generates mixture lean signals in synchronism with revolutions of an ouput shaft of the engine when the fuel injection control is being operative to supply the engine with the rich mixture; and



(c) third means for determining a malfunction of at least one of the fuel injection valves in accordance with the detection by the second means.

4,696,278

METHOD AND DEVICE FOR CONTROL OF INTERNAL COMBUSTION ENGINE AT END OF FUEL CUT OFF

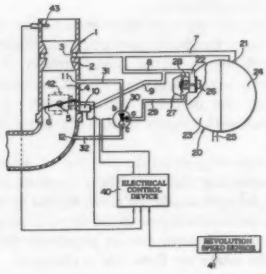
Toshimitsu Ito, and Chigaku Murata, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 19, 1986, Ser. No. 830,879

Claims priority, application Japan, Feb. 20, 1985, 60-31934

Int. Cl.[4] F02D *41/12*

U.S. Cl. 123—493 **8 Claims**



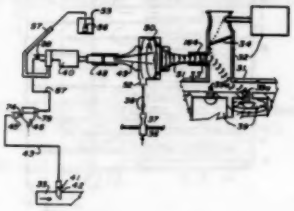
1. A method of fuel control for an engine for which cut off of fuel supply is performed while the engine is in a decelerating operational condition, comprising the steps of, at the time of fuel cut off termination, judging whether the rate of reduction of the revolution speed of the engine is greater than a predetermined value or not, and supplying a temporary injection of fuel through an auxiliary fuel injector into an intake system of said engine at substantially the same time as stopping the fuel cut off only when the rate of reduction of the revolution speed of the engine is greater than said predetermined value, wherein the amount of the temporary fuel injection is controlled according to the temperature of the air being sucked into said engine intake system so as to be decreased as said air temperature increases at least within a predetermined range of said air temperature.

4,696,279

COMBUSTION CONTROL SYSTEM

John E. Lindberg, Point Richmond, Calif., assignor to Combustion Control Developments, Ltd., Richmond, Calif.

Filed Aug. 30, 1985, Ser. No. 771,290
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—570 **30 Claims**



1. A combustion control method for an automotive engine in a vehicle having a large, open intake manifold leading to a plurality of cylinders with intake valves and exhaust valves leading to an exhaust conduit, comprising

keeping the intake manifold wide open with no ducts and no barriers, so that all of the cylinders are joined in said large, open intake manifold,

supplying fuel to said intake manifold,

withdrawing a sidestream of gas from said exhaust gas,

cooling said sidestream to below water condensation temperature,

removing the condensed water from said cooled sidestream,

creating a whirling, tornado-like stream of gas,

providing said stream with the cooled, moisture-free exhaust gas, and also with a desired quantity of liquid, said tornado-like stream acting to shear said liquid and vaporize it,

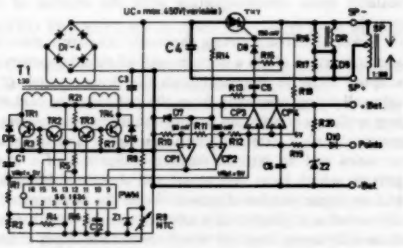
sending said stream with its exhaust gas and liquid vapor into said manifold with a low-pressure vortex center, thereby creating a vapor-laden whirling charge to each cylinder when its said intake valve is open.

4,696,280

HIGH-TENSION CAPACITOR-DISCHARGE IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINES

Gert G. Niggemeyer, Steinbecker Mühlenweg 95, D-2110 Buchholz, Fed. Rep. of Germany

Filed Aug. 5, 1986, Ser. No. 893,408
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535365
Int. Cl.[4] F02P *3/08*
U.S. Cl. 123—598 **14 Claims**



1. In a high voltage capacitor-discharge ignition apparatus for internal combustion engines and including an interruptable source of electrical power comprising a pulse width modulator controlled low-to-high voltage DC-DC converter operable as a blocking oscillator in the audio frequency range, a firing capacitor for receiving a high voltage charge from said electrical power source, and a thyristor triggerable by ignition pulses at its gate electrode to change from a nonconductive to a conductive condition for discharging said firing capacitor into an ignition coil having a primary winding and which generates a flyback pulse, said thyristor being returned to said nonconductive condition by interrupting the operation of said electrical power source, the improvement comprising:

at least a first comparator connected to the gate electrode of said thyristor for directly and continuously monitoring the voltage at said gate electrode as an indicator of the operating condition of the thyristor, for comparing said gate electrode voltage with at least a first predetermined reference voltage, and for generating an output signal based upon said comparison to interrupt the operation of said power source only so long as said thyristor is in said conductive condition; and

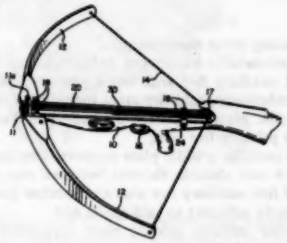
a circuit connected to the primary winding of the ignition coil for deriving an electrical pulse from the flyback pulse and accelerating the change of said thyristor from said conductive to said nonconductive condition.

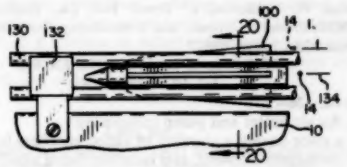
4,696,281

PROJECTILE SHOOTING GUIDE FOR BOWS

Jim Z. Nishioka, 1268 Hemlock NW., Salem, Oreg. 97304

Filed Oct. 6, 1986, Ser. No. 915,421
Int. Cl.[4] F41B *5/00*
U.S. Cl. 124—25 **5 Claims**





1. In combination, a projectile and a shooting bow,

said shooting bow comprising

an elongated frame extending longitudinally in a shooting direction of the projectile,

a pair of flexible arms with tip ends for providing tension in a bowstring, the pair of arms connected to the frame,

a bowstring extending between the tip ends of the flexible arms,

a bowstring catch and trigger mechanism on the frame for holding the bowstring in a drawn position and for releasing it to propel the projectile,

an elongated projectile track extending longitudinally on the elongated frame in a shooting direction of the projectile,

said projectile track including an elongated top portion and elongated opposite side portions, the top and side portions

being substantially open to allow easy grasping of the projectile when it is loaded on the top of the projectile track,

an elongated bar extending longitudinally over the top of at least a portion of the projectile when the latter is loaded on the top of the projectile track, the elongated bar allowing forwardly sliding movements of the projectile while restricting the latter's upwardly movements when it is propelled forwardly by the bowstring.

4,696,282

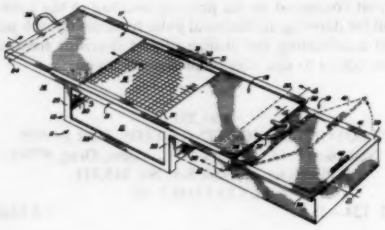
CAMP STOVE

Corkey Incitti, Weston, Colo. 81091

Filed Oct. 14, 1986, Ser. No. 918,208

Int. Cl.[4] F24C *1/16*

U.S. Cl. 126—9 R **8 Claims**



1. A camp stove comprising:

an open metallic framework defining below it first and second auxiliary fire area and a primary fire area disposed therebetween, said fire areas including a source of fire;

a metallic grate supported by said open framework above said primary fire area;

a first metallic griddle plate supported by said open framework and slidable thereon between one position above said first auxiliary fire area and another position over and directly adjacent to said grate; and

a second metallic griddle plate supported by said open framework above second auxiliary fire area.

4,696,283

KINETIC HEATER

Charles W. Kohlmetz, 27 Brook Hill La., Rochester, N.Y. 14625; James J. Urban, and John Kenny, both of Main St., Dunstable, Mass. 01827

Filed Mar. 6, 1986, Ser. No. 836,693

Int. Cl.[4] F24C *9/00*

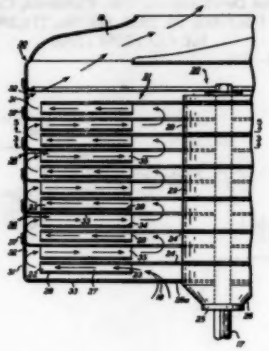
U.S. Cl. 126—247 **18 Claims**

1. An air heater and pump comprising:

a. a rotor having a plurality of vaned impellers for pumping air radially outward, said impellers being axially spaced in series and providing the sole motivating force for pumping air through said heater;

b. a stator having multi-stages interleaved with and out of contact with said rotor impellers, each of said stator stages having a radially walled passageway substantially filling the usable space between said rotor impellers without contacting said rotor impellers for guiding inbound air radially inward to an impeller inlet region; and

c. each of said stator stages having an outer rim extending axially of said heater from said stator passageway to engage an outer rim of an adjacent stator stage, for spacing said stator passageways clear of said impellers, each of said stator passageways extending inward from said outer rim and having an entrance spaced from said outer rim, and each of said outer rims forming an impingement surface radially surrounding one of said rotor impellers so that outwardly pumped air discharged from the surrrounded impeller against said impingement surface retroverts directly into an inbound course through one of said stator passageways so that each retroverted pass through



a stage of said rotor and stator increases the temperature of air being pumped through said heater.

4,696,284

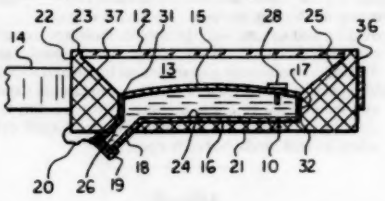
SOLAR HEATED CANTEEN

Dennis E. Stowell, P.O. Box 796, Parowan, Utah 84761

Continuation-in-part of Ser. No. 826,802, Feb. 6, 1986, abandoned. This application Dec. 4, 1986, Ser. No. 937,685

Int. Cl.[4] F24J *3/02*

U.S. Cl. 126—437 **7 Claims**



1. Apparatus for confining a supply of water and enabling said water to be heated by solar radiation, said apparatus comprising:

(a) a water-confining vessel having an panel of spherically rounded contour convexly directed outwardly from the vessel and centered upon an axis perpendicular to said vessel, an opposed lower panel, a boundary of circular configuration joining said upper and lower panels, and a sealable spout communicating with the interior of the vessel,

(b) à jacket of self-supporting thermally insulative material, and comprised of (1) a bottom wall of circular perimeter adapted to lie in abutment with said lower panel, (2) a sidewall rising upwardly from the perimeter of said bottom wall as a continuous extension thereof and having an exterior surfact extending between upper and lower extremities and an interior surface comprised of a lower portion which faces said vessel and abuts said boundary, and an upper portion disposed above the upper panel of the vessel and shaped as a conical section which tapers outwardly away from the vessel toward the upper extremity of said exterior surface and (3) a channel which permits close-fitting passage of said spout,

(c) a circular lens window of larger diameter than siad vessel affixed at its perimeter to the upper extremity of said sidewall and coacting with the jacket to define an air

chamber above the vessel, said lens being perpendicularly centered upon the axis of the upper panel and having a focal point coinciding with the center of curvature of said upper panel at a site on said axis below the bottom wall of the jacket, whereby light rays passing through the lens converge to the area of the upper panel while passing through the air chamber, and impinge perpendicularly upon the upper panel and heat the vessel, and

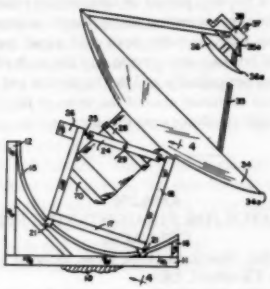
(d) a carrying strap forming a substantially closed loop, a part of which embraces the exterior surface of said sidewall.

4,696,285

SOLAR COOKER

David M. Zwach, 518 North State, New Ulm, Minn. 56073

Filed Nov. 15, 1985, Ser. No. 798,473
Int. Cl.[4] F24J *3/02*
U.S. Cl. 126—451 16 Claims



1. A solar unit comprising a solar oven having an open end, a generally concave parabolic main reflector joined to the oven to move therewith and reflect solar radiation away from the oven, said main reflector having a central opening opening to the oven open end, a generally parabolic convex secondary reflector for reflecting radiation from the main reflector through the central opening to the open end of the oven, means for mounting the secondary reflector on the main reflector for movement therewith, a frame, and means for mounting the oven on the frame for adjustable movement relative to the frame to permit adjusting the angular position relative to the earth, the last mentioned means including means for supporting the oven including first and second pairs of pivot members that respectively have a first pivot axis and a second pivot axis that extends perpendicular to the first pivot axis, the oven extending between each of the first pivot members and each of the second pivot members.

4,696,286

COATED TRANSPLANTS AND METHOD FOR MAKING SAME

Kent C. Cochrum, Corte Madera, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 711,664, Mar. 14, 1985, abandoned. This application May 22, 1986, Ser. No. 866,167
Claims priority, application Norway, Mar. 7, 1986, 860858
Int. Cl.[4] A61B *19/00*
U.S. Cl. 128—1 R 16 Claims

1. A transplant suitable for transplantation into a genetically dissimilar individual, said transplant being coated with an immunological barrier membrane that conforms to the surface of the transplant,

said membrane comprising a noncytotoxic inner layer that is bonded chemically to the surface of the transplant, and an outer, biologically compatible, water-insoluble semipermeable layer bonded chemically to the inner layer,

wherein the inner layer is comprised of a material selected from the group consisting of:

(a) aluminum hydroxide;

(b) a disaccharide;

(c) a polyfunctional cross-linking agent;

(d) an immunoglobulin to a surface component of the transplant;

(e) a lectin; and

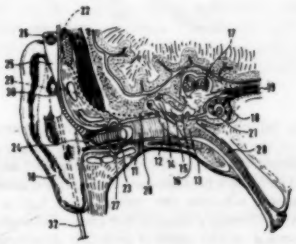
(f) a polyionic polyamino acid having an opposite charge to that of the transplant surface; and the outer layer is comprised of a polyamino acid that has reactive carboxyl, amino or imino side groups.

4,696,287

TRANSMISSION SYSTEM FOR IMPLANTED HEARING AIDS

Guenther Hortmann, Neckartenzlingen; Klaus Kunick, and Hans Fenner, both of Stuttgart, all of Fed. Rep. of Germany, assignors to HORTMANN GmbH, Neckartenzlingen, Fed. Rep. of Germany

Filed Feb. 26, 1986, Ser. No. 833,989
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506721
Int. Cl.[4] A61N *1/30*
U.S. Cl. 128—1 R 6 Claims



1. A transmission system for an implanted hearing aid, comprising at least one excitation electrode implanted in a patient's ear, an implanted receiver unit provided with a receiver coil, said receiver coil surrounding auditory channel of the ear; a transmitter unit provided with a separate transmitter coil, an acoustic converter coupled via said transmitter and receiver units to said excitation electrode, a fitting piece enclosing said transmitter coil, said fitting piece being inserted in said auditory channel at a position at which said transmitter coil is concentric with said receiver coil and a stable inductive coupling between said coils is established.

4,696,288

CALIBRATING APPARATUS AND METHOD OF USING SAME FOR GASTRIC BANDING SURGERY

Lubomyr I. Kuzmak, 657 Irvington Ave., Newark, N.J. 07106, and Robert E. Hoyt, 326 El Gaucho Rd., Santa Barbara, Calif. 93111

Filed Aug. 14, 1985, Ser. No. 766,091
Int. Cl.[4] A61B *19/00*
U.S. Cl. 128—1 R 8 Claims

1. A method for performing a gastric banding operation on the stomach of a human body comprising the steps of

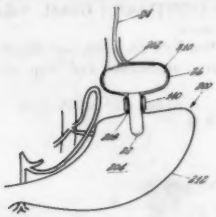
inserting into the opening of the stomach of a human body a calibrating apparatus comprising a single-lumen tubing which has a first orifice at the proximal portion thereof and a second orifice at the distal tip thereof which is operatively coupled to an elongated thin-walled sensor having a circular cross-section and which defines a cavity within the interior thereof and wherein the thin-walled sensor is capable of having its cross-sectional diameter varied in response to a variable force being applied to the

exterior of the sensor, a toroidal-shaped balloon operatively coupled to and surrounding the exterior of the single-lumen tubing at a preselected location near the distal tip and an elongated tubing which extends from a location exterior to the single-lumen tubing, through the interior of the single-lumen tubing, and into communication with the interior of the balloon and proceeding the calibrating apparatus into the interior of the stomach;

inflating the balloon while the calibrating apparatus is within the stomach by passing a fluid under pressure through said elongated tubing to expand the balloon to a selected expanded dimension and retrograding the inflated balloon against the stomach opening;

constricting the stomach located immediately below the expanded balloon by applying a adjustable gastric band around the periphery of the stomach and urging the interior of the stomach into engagement with and around the exterior of the sensor;

tightening the adjustable band around the periphery of the



stomach, which in turn applies pressure around the periphery of the exterior of the sensor, until a selected pressure is detected as being applied to the sensor and suturing the band to form a passageway between the inner walls of the stomach wherein the passageway has a diameter which is substantially equal to the cross-sectional diameter of the sensor at the applied pressure developed by the adjustable band to establish an upper cavity having a volume which is substantially equal to the selected expanded dimension of the balloon and a lower cavity which communiates with the first cavity through said passageway having said predetermined cross-sectional area;

suturing together the sidewalls of the stomach forming the upper and lower cavities enclosing the adjustable gastric band to defining an annular-shaped opening around the adjustable gastric band; and

withdrawing the fluid from the interior of the balloon, collapsing the same, and retrograding the calibrating apparatus through the opening of the first cavity and out of the human body.

4,696,289

METHOD OF PROMOTING VENOUS PUMP ACTION

Arthur M. N. Gardner, and Roger H. Fox, both of Devon, England, assignors to Electro-Biology, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 763,686, Aug. 5, 1985, Pat. No. 4,614,180, and a continuation-in-part of Ser. No. 794,443, Nov. 4, 1985, Pat. No. 4,614,179, said Ser. No. 763,686, is a continuation-in-part of Ser. No. 621,499, Jun. 18, 1984, abandoned, said Ser. No. 794,443, is a continuation-in-part of Ser. No. 751,150, Jul. 2, 1985, abandoned, said Ser. No. 751,150, is a division of Ser. No. 621,499,. This application Aug. 1, 1986, Ser. No. 889,376

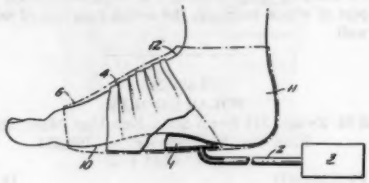
Claims priority, application United Kingdom, Jun. 22, 1983, 8316959; Nov. 18, 1983, 8330138

The portion of the term of this patent subsequent to Sep. 30, 2003, has been disclaimed.

Int. Cl.[4] A61H *7/00*

U.S. Cl. 128—64 **23 Claims**

1. The method of promoting venous pump action in the leg of a living body, which method comprises simultaneously applying (a) upward and spreading force at longitudinally spaced plantar regions of the sole of the foot, said regions being essentially limited by and between the ball and heel of the foot and (b) downward force at the region of the midtarsal joint, said forces being applied in a cyclical pattern of a relatively rapid-time period in which said forces are rapidly increased to a predetermined upper force limit, then said upper force limit



is retained for a holding period of time before relaxation for a period substantially exceeding an application time, whereby said application time includes both said rapid increase time period and said holding time period and the arch of the foot is caused to flatten periodically and this to stretch and neck down the internal local sectional area of the veins of the lateral plantar complex, with resulting venous-pump action.

4,696,290

APPARATUS FOR STRAIGHTENING SPINAL COLUMNS

Arthur D. Steffee, Moreland Hills, Ohio, assignor to AcroMed Corporation, Cleveland, Ohio

Division of Ser. No. 562,438, Dec. 16, 1983, Pat. No. 4,611,581. This application Mar. 31, 1986, Ser. No. 846,018

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—69 **8 Claims**

1. An apparatus for use with fasteners for maintaining vertebrae in a desired relationship, said apparatus comprising:

an elongated plate for connecting at least two vertebrae, said elongated plate having a first major side surface for facing the vertebrae and a second major side surface extending generally parallel to said first major side surface, said first and second major side surfaces having first and second minor side surfaces extending therebetween;

said elongated plate also having at least one elongated slot extending therethrough and intersecting said first and second major side surfaces and located along the longitudinal central axis of said elongated plate, said slot being capable of receiving a fastener therein at any one of a plurality of locations along the slot and which fastener is connectable with a vertebra; and

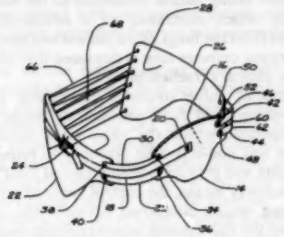
said slot being defined by opposed slot surfaces extending longitudinally of said elongated plate and arcuate recesses in said opposed slot surfaces and spaced therealong, the recesses in one of said opposed slot surfaces being aligned with the recesses in the other of said opposed slot surfaces to define said plurality of locations, said recesses comprising means for blocking sliding movement of aid elongated plate relative to the fastener and of said elongated plate relative to the vertebrae when the fastener is located in a pair of aligned recesses.

4,696,291

PELVIC STABILIZATION DEVICE

James H. Tyo, 633 E. Walnut St., Green Bay, Wis. 54301

Filed Mar. 6, 1986, Ser. No. 837,025
Int. Cl.[4] A61F 5/02
U.S. Cl. 128—78 10 Claims



1. A pelvic stabilization device comprising:

a substantially rigid abdomen plate mounted between the symphsis pubis distally and the anterior superior iliac spines laterally operable to compress the abdomen between the symphsis pubis distally and the anterior superior iliac spines laterally;

a first substantially rigid gluteal member operable to compress the right gluteal;

a second substantially rigid gluteal member, operable to compress the left gluteal; the skin contact surface of such abdomen plate and gluteal plates being made of a material insensitive to human skin, insoluble in and non-reactive to body fluids and cleaning solutions;

straps connecting the abdomen plate to each gluteal member;

a tension adjustment strap affixed to the abdomen plate and to the gluteal members;

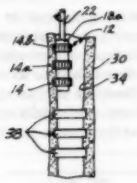
a fastener operable to secure the tension adjustment strap.

4,696,292

TOOL FOR USE IN ANCHORING IMPLANTABLE PROSTHESIS AND METHOD

Kingsbury G. Heiple, 2410 Derbyshire Rd., Cleveland Heights, Ohio 44106

Filed Jul. 2, 1985, Ser. No. 751,327
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 V 9 Claims



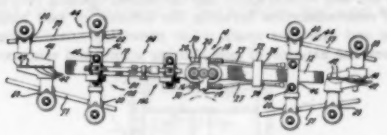
1. In a method for preparing a femur for the receipt of an implantable prosthesis comprising clearing the medullary canal of marrow, inserting a cutting tool having a rotatable cutter thereon interiorly of said canal, rotating said cutter and moving said tool laterally in said canal into engagement with a confronting interior surface of the canal to cut a groove in said interior surface, withdrawing said tool from said canal and inserting surgical cement into said canal with a prosthesis, to implant said prosthesis in the cement in said canal, with said cement entering said groove for firmly anchoring said prosthesis in said canal upon hardening of said cement.

4,696,293

HINGED EXTERNAL FIXATOR

Ciullo, Jerome V., 5914 Nottingham, Detroit, Mich. 48224

Filed Sep. 30, 1982, Ser. No. 432,090
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 ZK 12 Claims



1. An articulated external fixator for the joint of at least a pair of articulated tubular bony parts, comprising: first and second elongated structural members having adjacent ends pivotally connected for generally only single axis pivotal movement with respect to one another about the anatomic axis of articulation of said bony parts, each of said first and second structural members adapted to be positioned on one or the other of said bony parts in distraction with longitudinal axis generally parallel to the longitudinal axis of the associated bony part so that said articulated movement of said structural members corresponds with the articulated movement of said bony parts about the joint;

first and second holding means carried on said first and second structural members respectively and adapted to receive pins to be inserted in the bony part; and

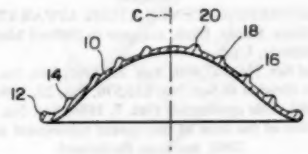
limiting means for limiting the articulated movement of said structural members.

4,696,294

CONTRACEPTIVE DEVICE AND RELATED METHOD

Franklin C. Reyner, 165 N. Village Ave., Rockville Center, N.Y. 11570

Filed Aug. 31, 1981, Ser. No. 298,209
Int. Cl.[4] A61F 5/46
U.S. Cl. 128—131 22 Claims



1. A diaphragm or pessary comprising a flexible wall having a shape adapted for accommodation in a vaginal cavity and for capping the cervical os in said cavity, said wall having an at least generally convex outer surface, and means in the form of projections distributed on said surface generally therethroughout for providing a texture simulating the natural vaginal mucosa.

4,696,295

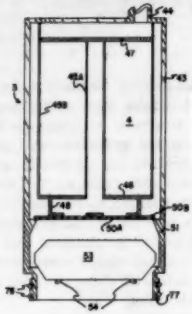
BREATHING APPARATUS

Trevor Constance-Hughes, Abergavenny, Wales, assignor to Siebe Gorman & Company Limited, Berkshire, England

Filed Mar. 6, 1986, Ser. No. 837,056
Claims priority, application United Kingdom, Mar. 6, 1985, 8505787; Apr. 15, 1985, 8509604; Jan. 27, 1986, 8601871
Int. Cl.[4] A62B 7/00
U.S. Cl. 128—202.26 11 Claims

1. Closed-circuit breathing apparatus comprising a breathing bag, and a purifier including housing means; permeable purifying material for removing carbon dioxide from a life-supporting gas mixture located within said housing means; first and

second permeable wall means separating said purifying material from respective first and second spaces within said housing means; said housing means defining a first and a second opening, each of the said first and second openings providing communication between the exterior and the interior of said housing means; the first opening providing direct communication between the exterior of said housing means and both said first space and said second space, and the second opening providing direct communication between the exterior of said housing means and said first space while providing communication between the exterior of said housing means and said second



space only through said first space, said first permeable wall means, said purifying material and said second permeable wall means in turn; non-return valve means permitting gas to flow between said first space and the exterior of said housing means through the first opening in one direction only so that gas flowing between said first space and the exterior of said housing means in the opposite direction caused to flow through said purifying material; and said purifier having said first opening in communication with said breathing bag and said second opening arranged, when said apparatus is in use, to be in communication with a user.

4,696,296

ASPIRATING/VENTILATING APPARATUS

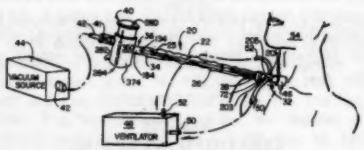
Darrel Palmer, Sandy, Utah, assignor to Ballard Medical Products, Midvale, Utah

Division of Ser. No. 767,400, Aug. 20, 1985, Pat. No. 4,638,539, which is a division of Ser. No. 633,570, Jul. 23, 1984, Pat. No. 4,569,344. This application Oct. 7, 1986, Ser. No. 916,341

The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—207.16 **6 Claims**



1. An indwelling ventilating aspirating apparatus by which a medical patient is subjected to involuntary respiratory therapy and by which fluids from the trachea and/or bronchi are evacuated, the apparatus comprising:

an elongated sterile aspirating catheter tube for manual insertion into the trachea/bronchi of the patient;

a sterility preserving collapsible envelope essentially surrounding the catheter tube, the envelope maintaining sterility of the catheter tube while accommodating manual manipulation of the catheter tube to and fro by externally collapsing the envelope upon the catheter tube;

first coupling means accommodating manual reciprocation of the catheter tube therethrough;

second coupling means comprising means associated with a proximal end of the catheter tube;

tracheostomy fitting means connected to the first coupling means by which ventilating air is introduced into and exhausted from the lungs of the patient and through which the aspirating catheter tube is displaced into and removed from the patient's trachea/bronchi;

vacuum control valve structure comprising valve body means having fluid flow passageway means and valve means operable within the valve body means between activated and non-activated positions to respectively accommodate and prohibit vacuum caused fluid flow along the passageway means, the control valve structure further comprising means interposed between the valve body means and the valve means which prohibits bacterial entry between the valve body means and the valve means and thus prevents bacterial contamination within the passageway means and along the catheter tube.

4,696,297

PROCESS FOR COLLECTING FRAGMENTS WHICH ARE OBTAINED ON SHATTERING STONES IN BODY CAVITIES OF LIVING HUMANS AND OTHER MAMMALS

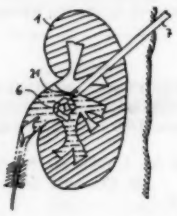
Peter Pleines, Cologne, and Erich Wolf, Overath, both of Fed. Rep. of Germany, assignors to Farco-Pharma GmbH, Cologne, Fed. Rep. of Germany

Filed Apr. 23, 1985, Ser. No. 726,096

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506873

Int. Cl.[4] A61B *17/00, 17/22*

U.S. Cl. 128—303.1 **21 Claims**



1. A method of shattering a stone in a body cavity of a human or another mammal, comprising the steps of surrounding the stone with a substance in flowable state; transforming said substance to a non-flowable state so that at least the major part of the stone is confined by said substance; and shattering the stone while said substance is in said non-flowable state and confines the stone to thereby reduce scattering of the resulting stone fragments.

4,696,298

VITRECTOMY CUTTING MECHANISM

Daniel E. Higgins, St. Louis, and James C. Easley, Fenton, both of Mo., assignors to Storz Instrument Company, St. Louis, Mo.

Filed Nov. 19, 1985, Ser. No. 799,748

Int. Cl.[4] A61B *17/32*

U.S. Cl. 128—305 **16 Claims**

1. A microsurgical cutting device for cutting and removing fibrous gel, comprising a housing, a substantially hollow outer needle having an outward end with an aperture therein, a cutting blade disposed within said outer needle, actuation means, and suction means;

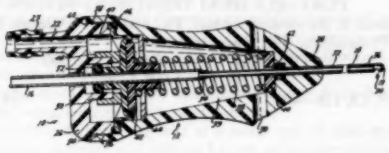
said housing containing a spring compartment and containing means for communicating with said actuation means, said spring compartment containing a compression spring acting against said actuation means;

said outer needle extending outwardly from said housing and containing a hollow tubular member reciprocable within said outer needle, said hollow tubular member communicating with said suction means and having said cutting blade extending toward said apertured end of said outer needle;

said inner tubular member being reciprocable within said outer needle between a first open position and a second cutting position wherein said cutting blade slides across said apertured end of said outer needle, said actuation means tending to force said inner tubular member and cutting blade toward said second position and said compression spring tending to restore said inner tubular member and cutting blade to said first position;

said aperture in said outer needle having a cutting edge and a radially rounded leading edge opposing said cutting edge, said cutting edge having an axially inwardly curved surface and said opposing edge having a surface inwardly beveled toward said cutting edge; and

wherein said actuation means comprises a sealed fluid com-



partment in said housing and communicating with a pressurized fluid source and a diaphragm, said fluid compartment separated from said spring compartment by said diaphragm, said diaphragm urging said tubular member toward said second position when pressurized fluid is injected into said fluid chamber.

8. An improved microsurgical cutting blade for use with a surgical probe having a reciprocable blade holding actuation means, suction means and an outer probe needle having a smooth, uniform inner diameter and at least one cutting edge wherein:

said blade is substantially tubular and is reciprocable within and substantially conforms to the inner diameter of said probe needle;

said blade has a first end disposed within and supported by said blade holding means and is operatingly connected to said suction means; and

said blade has a preformed flared cutting end having a predetermined degree of flexibility said cutting end receiving a compressive force from said probe needle and said cutting end providing a corresponding tension force, said tension force tending to force said flared end against said probe needle and increasing the efficiency of the shearing effect of reciprocating said blade past said cutting edge of said probe needle.

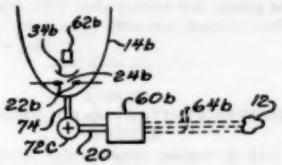
4,696,299

NON-INVASIVE DESTRUCTION OF KIDNEY STONES

William R. Shene, Plattsburgh, N.Y.; Christopher Nowacki, Arlington Heights, and Alfred G. Brisson, Schaumburg, both of Ill., assignors to Trutek Research, Inc., Lake Zurich, Ill.

Division of Ser. No. 666,770, Oct. 31, 1984, Pat. No. 4,620,545.
This application Apr. 3, 1986, Ser. No. 847,696
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—328 **10 Claims**

1. Apparatus for the non-invasive disintegration of concretions such as kidney stones within a living body, comprising means including a focussing reflector comprising a portion of an ellipsoid open at one end and having a first focus point within said reflector and having a second focus point outside of said reflector positioned beyond said open end, said first and second focus points lying on the focal axis of said reflector, said reflector being adapted to contain a fluid such as water, a fluid retaining diaphragm closing said open end and engagable with said body, sonic aiming means disposed entirely exteriorly of said reflector and positioned relative to said reflector to permit said sonic aiming means to focus on said concretion exteriorly of and free of obstruction by said reflector, said sonic aiming



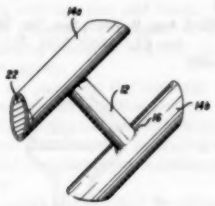
means having a focussing direction displaced from and non-intersecting with said reflector focal axis, said reflector being interconnected with and movable with said sonic aiming means focus to bring said second focus point into coincidence with said concretion with concurrent movement of said sonic aiming means away from said concretion, and spark gap means in said reflector at said first focus point for generating a shock wave which will travel through said fluid, said diaphram and through said body to disintegrate said concretion.

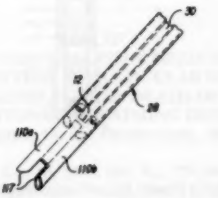
4,696,300

FASTENER FOR JOINING MATERIALS

Gary Anderson, Dorchester, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Filed Apr. 11, 1985, Ser. No. 722,083
Int. Cl.[4] A61B *17/04*
U.S. Cl. 128—334 R **15 Claims**





1. Apparatus for fastening materials, comprising:

a connecting member having at least two ends;

a plurality of head members, one connected to each of said ends, with each head having at least two ends defining non-parallel planes; and

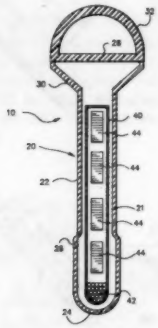
means for driving said heads through needles having slotted bores;

wherein said head ends are provided with apertures disposed to securely receive the driving means.

4,696,301
WOUND CLOSING METHOD
David J. Barabe, 2741 Lansdale La., Winston-Salem, N.C. 27103
Filed Jul. 16, 1986, Ser. No. 886,637
Int. Cl.[4] A61L *17/00*
U.S. Cl. 128—335.5 **2 Claims**

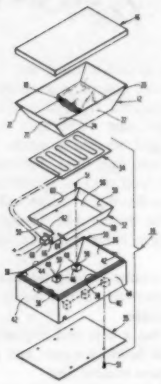
1. A surgical method for closing an elongate wound of a patient without requiring piercing of the skin comprising:
applying a small amount of glue to the patient's skin at spaced intervals along each side of the wound and then placing one end of each of a plurality of suture threads into a respective one of said spaced glue applications until it is adhesively secured to the skin;
tying together laterally spaced-apart suture threads into a plurality of suture knots in order to close the wound and maintain it in a closed condition to facilitate healing thereof; and
maintaining the tied sutures in place until the wound heals.

4,696,302
PROCTOLOGIC DEVICE
Leigh B. Clark, R.F.D. Box 142, Del Mar, Calif. 92014; Larry Howell, 6939 Caminito Entrada, San Diego, Calif. 92119, and Richard G. Hunter, 9129 Village Glen Dr., #275, San Diego, Calif. 92123
Filed Aug. 9, 1985, Ser. No. 764,106
Int. Cl.[4] A61F *7/03, 7/12*
U.S. Cl. 128—401 **13 Claims**



1. A disposable device for self-administered heat treatment, comprising:
an outer vessel dimensioned for manual rectal insertion comprising:
a hollow, thin walled, flexible, elongated tubular body portion having a volume less than about 7 cubic centimeters; with an inner closed and, and an outer closed end;
chemical means within said outer vessel including components for producing an exothermic reaction and for heating and maintaining said outer vessel at a temperature of about 45 degrees centigrade; at least a particular one of the components being mobile for mixture with other components to provide a thermal reaction between component;
an inner vessel disposed within said outer vessel; said inner vessel containing at least one of said chemical components; said inner vessel being fracturable upon flexion of said outer vessel to provide for mixture of the mobile component with the other components;
said components comprising:
water;
a salt for quickly raising the device to a desired temperature through dissolution in said water;
an oxide for providing heat over a prolonged period through hydration with said water; and
a hydrophobic agent.

4,696,303
PORTABLE HEAT TREATMENT SYSTEM
Ronald J. Bernardini, Ambler, Pa., assignor to Michael Litman, Philadelphia, Pa., a part interest
Filed May 7, 1982, Ser. No. 376,000
Int. Cl.[4] A61F *7/00*
U.S. Cl. 128—402 **19 Claims**



1. A portable heat treatment system for providing heat therapy to part of the human body, said system being characterized by:
(a) a portable heating shoe having;
(1) a heat conductive base member,
(2) heating means connected to said base member for transmitting heat along said base member;
(b) a removable and replaceable unit including;
(1) a heat conductive container having;
(i) a base,
(ii) peripheral walls extending upwardly from the base and cooperating therewith to define a heat treatment compartment;
(2) a body treating material including paraffin wax in the heat treating compartment of the container for application in a liquid state to a part of the human body to be provided with heat therapy and
(3) said container being removably retained within te heating shoe with the base of said container being supported by the heat conductive base member of said shoe.

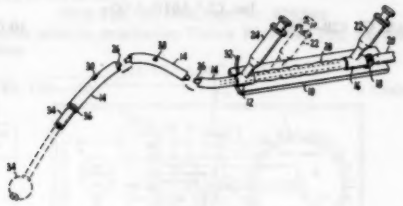
4,696,304
THERMODILUTION FLOW-DIRECTED CATHETER ASSEMBLY AND METHOD

Albert K. Chin, Irving, Tex., assignor to Thomas J. Fogarty, Palo Alto, Calif.

Continuation of Ser. No. 648,822, Sep. 10, 1984, abandoned. This application Apr. 23, 1986, Ser. No. 855,143

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—673 **19 Claims**



1. A catheter assembly comprising:
an outer catheter having a first lumen;
an inner catheter slidably disposed in said first lumen of said outer catheter and having second and third lumens, with said outer catheter extending along a substantial length of said inner catheter;
retaining means to prevent said inner catheter from being fully retracted from said outer catheter;
an inflatable balloon disposed at a distal end of said inner catheter, with the said balloon having an interior which is in communication with said second lumen;
an inflation port disposed at a proximal end of said inner catheter, opposite said distal end, and in communication with said second lumen, said inflation port for coupling to a balloon inflation source; and
a pressure port disposed at said proximal end of said inner catheter and in communication with said third lumen, said pressure port for coupling to pressure measurement apparatus.

4,696,305
FLOW CONTROLLER

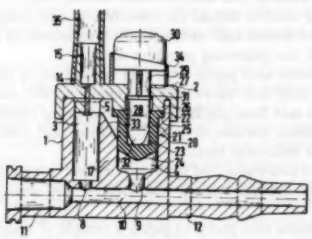
Peter von Berg, Neukeferloh, Fed. Rep. of Germany, assignor to Peter von Berg Extrakorporale Systems-Medizintechnik GmbH, Munich, Fed. Rep. of Germany

Filed Jun. 19, 1986, Ser. No. 876,170

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1985, 3525191

Int. Cl.[4] A61M *5/00;* **F16K** *51/00*

U.S. Cl. 128—673 **14 Claims**



1. A flow control device for use in fluid flow systems for pressure monitoring during blood pressure measurements, comprising a housing having at least one passage therethrough, said passage having an inlet and an outlet adapted for coupling to a catheter which is continuously flushed by the fluid, a capillary bore defining a non-closable first flow path from said inlet to said outlet, a closeable second flow path from said inlet to said outlet having a greater cross-sectional area than said first flow path, said second flow path comprising a chamber and a valve within said chamber having a valve body formed of elastically deformable material having a poriton positioned to press against the wall of said chamber to close off said second flow path, and a plunger movably coupled to said housing and positioned to distend and elongate said valve body portion within said chamber, thereby reducing the cross-sectional area of said valve body portion and causing said valve body portion to move away from said chamber wall to open said second flow path.

4,696,306
ELECTROCARDIOGRAM PLAYBACK SYSTEM AND METHOD

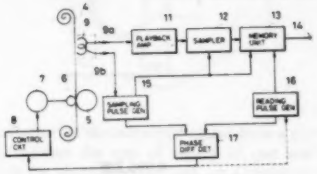
Yoshihiko Shiozaki, Tokyo, Japan, assignor to Akai Electric Co., Ltd., Tokyo, Japan

Filed Nov. 20, 1986, Ser. No. 932,528

Claims priority, application Japan, Nov. 20, 1985, 60-262017

Int. Cl.[4] A61B *5/04;* **G01D** *9/00*

U.S. Cl. 128—711 **11 Claims**



1. An electrocardiogram playback system comprising:
a plurality of track heads for simultaneously reading an electrocardiogram recorded on one track of a multi-track magnetic tape and reference clock signals recorded on another track of said tape;
means for driving said tape past said heads;
a sampling pulse generator connected to said heads for producing sampling pulses in response to the recorded reference clock signals;
sampling means for sampling the recorded electrocardiogram in response to said sampling pulses;
memory means for storing the sampled electrocardiogram;
reading pulse generator means for producing a timing pulse for reading said sampled electrocardiogram from said memory means;
a phase detector means for detecting the phase between said sampling pulses and said timing pulses; and
control circuit means for maintaining said phase difference constant.

4,696,307
DEVICE FOR CONTINUOUSLY DETECTING THE BREATHING RHYTHM, IN PARTICULAR WITH A VIEW TO PREVENTING THE SUDDEN DEATH OF AN INFANT DUE TO CESSATION OF BREATHING DURING SLEEP

Francois F. Montgieux, 15, rue Palspharnerie, 84000 Avignon, France

Filed Sep. 10, 1985, Ser. No. 774,445

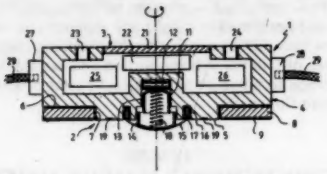
Claims priority, application France, Sep. 11, 1984, 84 13915

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—721 **7 Claims**

1. A device for the continuous detection of a child's breathing rhythm, in particular for preventing the sudden death of the child by the cessation of breathing during sleep, this device comprising a box having an application wall, said application wall comprising a rigid peripheral zone and a movable centreal zone adapted to follow movements produced on the child's

skin by the child's breathing, said box housing a transducer which comprises a movable metallized electret, an electrode rigidly mounted in the box and placed opposite said electret and reducing means which are interposed between said movable zone and said electret and which transmit to said electret a fraction of the movements of said central zone, said electret



being electrically charged and inducing on said electrode a current which is representative of said movements, said box being equipped with fasteners to be connected to the body of the child and which are adapted to keep said peripheral zone and said central zone against the skin of the child, said fasteners providing the transducer through said peripheral zone and said box with a reference position.

4,696,308

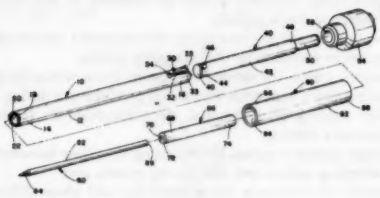
CORE SAMPLING APPARATUS

Bruce T. Meller, Middleburg Heights; Michael T. Manley, Shaker Heights, and Bernard N. Stulberg, Chagrin Falls, all of Ohio, assignors to The Cleveland Clinic Foundation, Cleveland, Ohio

Filed Apr. 9, 1986, Ser. No. 849,781

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—754 **22 Claims**



1. A non-reusable device for extracting biopsy cores or the like, comprising:

a hollow tubular body having front and rear ends and a longitudinal bore extending in said body between said ends, at least a major portion of said bore having a smooth periphery;

an annular cutting edge, adapted for rotary penetration into tissue, provided on said body front end;

an axial engagement means provided on said body rear end, said axial engagement means including a slit extending from said body rear end towards said body front end, said slit terminating in an enlarged aperture which is adapted to cooperate with a protrusion of an associated adapter means to enable said tubular body to rotate; and,

blocking means for preventing reuse of the device once said axial engagement means has been engaged by said associated adapter means.

4,696,309

PORTABLE APPARATUS FOR TAKING BLOOD SAMPLES

Eberhart Stephan, Freihorstfeld 70, D-3000 Hannover 71, Fed. Rep. of Germany

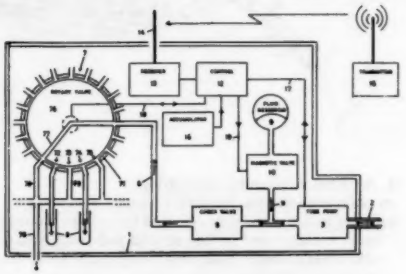
PCT No. PCT/DE84/00078, § 371 Date Dec. 11, 1984, § 102(e) Date Dec. 11, 1984, PCT Pub. No. WO84/04033, PCT Pub. Date Oct. 25, 1984

PCT Filed Apr. 5, 1984, Ser. No. 691,570

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1983, 3313074

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—762 **10 Claims**



1. Portable extraction apparatus of a size to be worn on the body for sequentially taking samples of blood and other body fluids comprising a housing containing:

pump means having an outlet and an inlet, and first conduit means for connecting said inlet of said pump means to a catheter,

multiple storage means providing a plurality of chambers for separately storing a plurality of samples of body fluid,

fluid discharge means comprising a common discharge passage for discharging fluid not to be stored,

first valve means having an outlet connectable alternatively to said storage means and said fluid discharge means and an inlet,

second conduit means connecting the outlet of said pump with the inlet of said first valve means,

a check valve in said second conduit means downstream of said pump to restrict flow of fluid in said second conduit means to flow in a direction from said pump to said first valve means,

fluid reservoir means for storing a supply of rinsing fluid,

third conduit means connecting said rinsing fluid reservoir means to a junction with said second conduit means at a location between said pump and said check valve,

second valve means in said third conduit means for opening and closing said third conduit means, and,

central control means for controlling said pump, said first valve means and said second valve means in accordance with the following program to:

(a) operate said pump with said second valve means closed and said first valve means connecting the outlet thereof with said fluid discharge means to pump rinsing fluid and an initial portion of body fluid from said catheter to said fluid discharge means,

(b) stop said pump and shift said first valve means to connect the outlet thereof with a chamber of said multiple storage means,

(c) operate said pump to pump a sample of body fluid from said catheter to said chamber of said multiple storage means

(d) stop said pump and shift said first valve means to connect the outlet thereof to said fluid discharge means,

(e) open said second valve means for a short period of time to supply rinsing fluid through said third conduit means to

said second conduit means, check valve and first valve means and to said pump and said first conduit means, and

(f) close said second valve means and repeat said program with said outlet of said first valve means connected to a different chamber of said multiple storage means.

4,696,310

PAPER FEED FOR CIGARETTE MAKING MACHINES

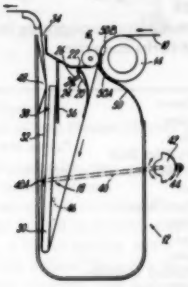
Dennis Graham-Troll, Saunderton, England, assignor to Molins PLC, Great Britain

Filed Feb. 18, 1986, Ser. No. 829,988

Claims priority, application United Kingdom, Feb. 18, 1985, 8504044

Int. Cl.[4] A24C *5/20*

U.S. Cl. 131—105 **8 Claims**



1. A reservoir for a bobbin changer for cigarette paper or a similar paper web including, adjacent to an inlet at which the paper enters the reservoir, a deflector which is mounted in the reservoir for movement toward and away from the inlet and is arranged to engage and deflect the paper as it enters the reservoir, at least while paper is being accumulated in the reservoir, and to promote the folding of the paper into loops in which the paper can safely be stored in the reservoir.

4,696,311

FORMING A ROD OF SMOKABLE MATERIAL

Brian C. Chard, Bristol; John D. Hooper, and Christopher R. Bale, both of Keynsham, all of England, assignors to Imperial Group Public Limited Company, England

Filed Dec. 19, 1985, Ser. No. 810,502

Claims priority, application United Kingdom, Dec. 21, 1984, 8432410

Int. Cl.[4] A24C *5/18*

U.S. Cl. 131—109.1 **7 Claims**

1. An apparatus for controlling the ratio of two fluent materials fed from hopper means containing separate first and second fluent materials to a receiving area, the apparatus comprising,

(a) conveyor means arranged to receive the fluent materials from the hopper means so that the fluent materials lie in juxtaposition on the conveyor means,

(b) means for controlling the speed of the conveyor means,

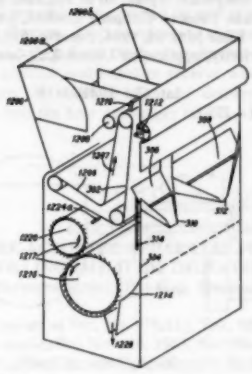
(c) chute means for transferring the fluent materials in the same relative juxtaposition to the receiving area,

(d) means for continuously removing a proportion of the fluent materials from the receiving area thereby leaving a proportion of the fluent materials in the receiving area,

(e) first and second controllable interception means for independently intercepting and diverting away from the receiving area respective first and second fluent materials falling down the chute means,

(f) first and second monitor means for monitoring the quantities of the first and second fluent materials respectively remaining in the receiving area and generating respective first or second signals dependent on the quantity of the first or second fluent material falling below a first predetermined level in the receiving area, and,

(g) first circuit means responsive to the said signals and adapted on receipt of one or said signals that the amount of one said fluent material has fallen below said predetermined level in the receiving area to actuate one of the interception means so as to intercept and divert other said fluent material away from the receiving area and to increase the speed of the conveyor means from a first value so as to increase the rate of supply of one said fluent material to the receiving area, and, on a cessation of said signal indicating that the amount of one said fluent material has risen to said first predetermined level in the receiving area, to de-actuate said one of the interception means so as to restore flow of other said fluent material to the receiving area and to decrease the speed of the conveyor means to its first value.



4,696,312

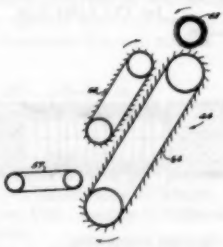
METHOD AND APPARATUS FOR PRODUCING CIGARETTE FILLER

Louis R. Turano, Colonial Heights; William T. Callaham; John F. Sherwood, both of Richmond, and Richard E. Thatcher, Chester, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Mar. 17, 1986, Ser. No. 839,922

Int. Cl.[4] A24B *3/07*

U.S. Cl. 131—109.1 **10 Claims**



1. A method for processing whole leaf tobacco for producing cigarette filler, said method comprising the steps of:

cutting said whole leaf tobacco to substantially the same width as cigarette filler to produce strands of tobacco consisting of lamina and strands of tobacco comprising lamina and stem;

carding said cut whole leaf tobacco, without first cutting said strands to a shorter length, to disentangle said strands of cut leaf; and

separating said strands comprising lamina and stem from said strands consisting of lamina.

4,696,313

EXPANSION OF TOBACCO

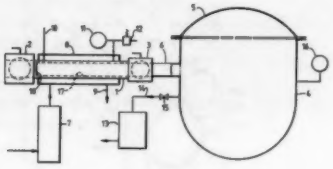
Ian C. Brown, Winchester; Roger W. Hedge, Lymington, and David J. Molyneux, Hythe, all of England, assignors to British-American Tobacco Company Limited, London, England

Filed May 31, 1984, Ser. No. 615,998

Claims priority, application United Kingdom, Jun. 10, 1983, 8315987

Int. Cl.[4] A24B *3/18*

U.S. Cl. 131—291 **14 Claims**



1. A method of expanding tobacco lamina, comprising contacting tobacco lamina with an organic expansion agent in the liquid phase having a boiling point temperature at a pressure of one atmosphere, of at least, about 20° C., heating within the interior of a closed first vessel tobacco lamina thus contacted so that the temperature of said agent in the liquid phase in said tobacco lamina attains a temperature value above the boiling point temperature corresponding to a release pressure of said agent, which release pressure is lower than the pressure in said first vessel at said temperature value, said temperature value being below the boiling point temperature of said agent at said pressure in said first vessel, and subsequently bringing the interior of said first vessel suddenly into gas flow communication with the interior of a closed second vessel in which the pressure immediately before the establishment of said communication is said release pressure, whereby the filling value of said tobacco lamina is increased by at least 50%.

4,696,314

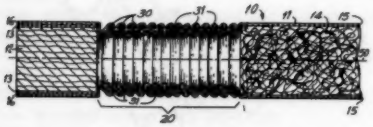
FILTER CIGARETTE

Andrew G. Kallianos, Midlothian, Va., and Christopher N. Kounnas, Durham, N.C., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Apr. 17, 1986, Ser. No. 853,157

Int. Cl.[4] A24D *3/04*

U.S. Cl. 131—336 **37 Claims**



1. A filter cigarette comprising:

a substantially cylindrical cigarette rod;

a substantially cylindrical filter plug having a mouth end and a rod end open to the passage of air and smoke, the cigarette rod and the filter plug having substantially the same cross-sectional area and shape;

plug wrapping circumscribing said filter plug;

tipping paper circumscribing said wrapped filter plug;

a section of flexible corrugated tubing having a first end affixed to said filter plug and a second end affixed to said cigarette rod, whereby the shape of said filter cigarette can be changed; and

means for varying the air dilution value of said filter cigarette responsive to the change of shape of said filter cigarette.

4,696,315

HERBAL SNUFF COMPOSITION

John K. Summers, Anderson, Ind., assignor to Better Life International, Inc., Stuart, Fla.

Filed Sep. 19, 1985, Ser. No. 777,614

Int. Cl.[4] A24B *15/18;* **A24D** *1/18*

U.S. Cl. 131—359 **33 Claims**

22. A herbal composition comprising herbs and casing material wherein said herbs comprise:

Red Clover	10 gms.
Dandelion	1.3 gms.
Echinacia	0.6 gms.
Slippery Elm Bark	0.2 gms.
and wherein said casing material comprises:	
Sea Salt	1.3 gms.
Jamacian Ginger	0.7 gms.
Rose hips	0.4 gms.
Cayenne	1.2 gms.
Molasses	15.0 gms.
Unsulfurized Molasses	0.5 gms.
Distilled water	1.0 gms.
and Mint Oils	
Spearmint	1.0 drops
Wintergreen	1.0 drops
Clove	1.0 drops

4,696,316

STAND FOR POLISHING ARTIFICIAL FINGERNAILS

Sandra M. Stanley, 2603 Massachusetts Ave., Lemon Grove, Calif. 92045

Filed Jan. 10, 1986, Ser. No. 817,593

Int. Cl.[4] A45D *29/00*

U.S. Cl. 132—73 **4 Claims**

1. A stand for retaining and polishing artificial fingernails, with comprises:

a plate having an upper surface and a bottom surface;

means for supporting the plate, wherein said means for supporting is secured to the bottom surface;

at least one base for supporting fingernails secured to the upper surface;

a releasable means for adhering the fingernails to the base;

wherein the base comprises at least one ridge having a convex head, said head being shaped and dimensioned to receive, retain and provide elevation to the fingernails.

4,696,317

VANITY CASE

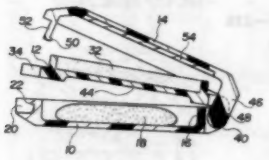
Yuji Shioi, Tokyo, and Yukitomo Yuhara, Abiko, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1985, Ser. No. 795,666

Claims priority, application Japan, May 17, 1985, 60-72242[U]

Int. Cl.[4] A45D *33/00*

U.S. Cl. 132—82 R 6 Claims



1. A vanity case comprising:

a receptacle member having formed therein a hollow space for receiving therein a puff;

a cover member hinged with said receptacle member at respective rear ends thereof; and

a tray disposed between said receptacle member and said cover member and hinged therewith, said tray including an upper surface, a lower surface and a periphery, said upper surface having defined thereon a space for containing therein cosmetic material, said periphery being sandwiched between said receptacle member and said cover member, and said lower surface having formed therein a concavity extending between opposite sides of said tray to define a recess, said recess communicating said hollow space to the outside of said vanity case to thereby ventilate said hollow space.

4,696,318

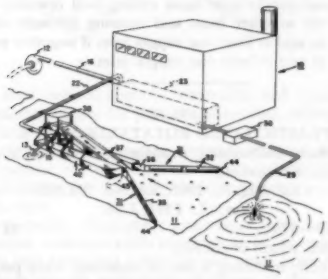
WASHING METHODS AND APPARATUS FOR HEAT EXCHANGER TUBE CLEANING PLUGS

Millard F. Smith, Westport, Conn., assignor to Slickbar Products Corp., Southport, Conn.

Filed Nov. 12, 1985, Ser. No. 797,203

Int. Cl.[4] B08B *3/02*

U.S. Cl. 134—73 10 Claims



1. Apparatus for cleaning and recycling flexible floating cleaning plugs introduced into the tubes of a power plant heat exchanger located near a flowing body of water comprising

A. a recycling pump having its intake positioned in a body of water and its outlet connected to one end of the heat exchanger tubes to deliver cooling water,

B. a cooling water outlet conduit connected to deliver used cooling water from the other end of the heat exchanger tubes and a plurality of said flexible floating cleaning plugs propelled therethrough to discharge them into said flowing body of water,

C. a containment barrier positioned downstream from the discharge of the outlet conduit, and having a convergent weir region at its downstream end,

D. an upward traveling conveyor positioned to pick up floating cleaning plugs arriving at the convergent weir which separates the plugs from the flotsam and conveys them through a washing zone,

E. washing spray means in the washing zone positioned to sluice away from said plugs carried by said conveyor the accumulated flotsam, scale, sediment, dirt and sludge gathered by the plugs from the heat exchanger tubes, and

F. a recycling conduit positioned to receive washed plugs emerging from the washing zone and deliver them for recycled use into the heat exchanger tubes.

4,696,319

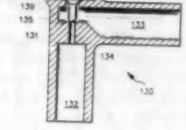
MOISTURE-ACTUATED APPARATUS FOR CONTROLLING THE FLOW OF WATER

Martin Gant, 2 Bernarra Street, The Gap, Queensland 4061, Australia

Continuation-in-part of Ser. No. 579,112, Feb. 10, 1984, abandoned. This application Nov. 18, 1985, Ser. No. 798,976

Int. Cl.[4] A01G *27/00*

U.S. Cl. 137—78.3 21 Claims



1. An actuating element, comprising:

a wicking matrix lamina formed from strands of wicking material arranged to form a regular, two-dimensional matrix of recesses; and

thixotropic, hydrophilic, mineral expandite material in said recesses for expandingly absorbing moisture from a moisture-conducting medium having a higher concentration of moisture than said material and for contractingly emitting moisture to said medium when said medium has a lower concentration of moisture than said material.

4,696,320

PRESSURE CONTROL VALVE WITH PUSH-PULL LOCKING ADJUSTMENT KNOB

Walter E. Bull, Aurora, Colo., assignor to Wilkerson Corporation, Englewood, Colo.

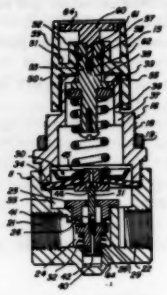
Filed Dec. 5, 1986, Ser. No. 938,484

Int. Cl.[4] G05D *11/00*

U.S. Cl. 137—116.5 9 Claims

1. In a pressure regulator for fluid pressure lines, the regulator including a valve body housing a pressure regulator valve, a valve stem rotatably housed in a bonnet mounted on said valve body for adjusting said valve, and a knob in rotational engagement with said valve stem for rotating the same, the

improvement comprising means mounting said knob for sliding movement on said valve stem and means on said knob releasably and slidably engagable with said bonnet for selectively preventing rotation of said knob.

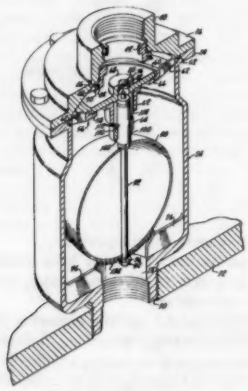


4,696,321

AIR RELEASE AND VACUUM BREAKER VALVE SYSTEM

James R. Reese, and William Yelich, both of Costa Mesa, Calif., assignors to Cla-Val Company, Costa Mesa, Calif.

Filed May 2, 1986, Ser. No. 858,666
Int. Cl.[4] F16K *33/00, 31/20*
U.S. Cl. 137—202 **19 Claims**



1. In an air release and vacuum breaker vacuum breaker valve having a valve body defining a float chamber and a chamber entrance, and having a float mounted in the chamber for vertical motion in accordance with the level of liquid in the chamber, said valve having valving elements connected to be operated to open or close the float chamber to ambient atmosphere in response to motion of said float within the chamber, and wherein liquid flowing at high velocity into said chamber through said chamber entrance tends to create a decreased pressure effect at a lower side of said float, thereby decreasing effective buoyancy of the float, whereby the float tends to rise suddenly and cause undesirably rapid closing of said valve elements as liquid in said chamber rises, the improvement comprising

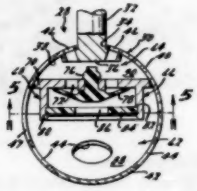
means on said float for attenuating the decreased pressure effect created by flow of liquid at high velocity into said chamber, said means comprising liquid flow disturbing means on said float positioned closely adjacent to and extending along the surface of a lower portion of said float.

4,696,322

FAUCET VALVE WITH ANTI-SIPHON BACK FLOW PREVENTER

Alfons Knapp, Biberach an der Riss, Fed. Rep. of Germany; Robert D. Roland, Zionsville, and Joe D. Hutto, Indianapolis, both of Ind., assignors to Masco Corporation, Taylor, Mich.

Filed Dec. 5, 1985, Ser. No. 805,280
Int. Cl.[4] F16K *24/02*
U.S. Cl. 137—218 **15 Claims**



1. A faucet valve characterized by:

a housing having a valve chamber, at least one supply inlet and a supply outlet in communication with said valve chamber;

a ball valve mounted within said valve chamber having a valving surface with valve port means therethrough for selectively covering and uncovering said at least one supply inlet and closing and opening communication to said supply outlet;

said ball valve having a ball section and control stem extending therefrom;

said control stem extending through an opening in said housing;

a seal operably mounted between said ball valve and housing to prevent fluid from said valve chamber to flow between said ball valve and housing to said opening;

an aperture extending through the ball section and in communication with said opening;

said opening, aperture, hollow interior and valve port means of said ball valve forming an anti-siphon passageway to said at least one supply inlet;

a check valve mounted within said ball valve in said anti-siphon passageway to prevent hydraulic fluid from said at least one supply inlet from exiting said opening and to allow air to enter from said opening through said ball valve to said at least one supply inlet if negative pressure exists at said at least one supply inlet.

4,696,323

PLASTIC LINED ROTATABLE VALVE

Rene Iff, Bern, Switzerland, assignor to Neotecha AG, Hombrechtikon, Switzerland

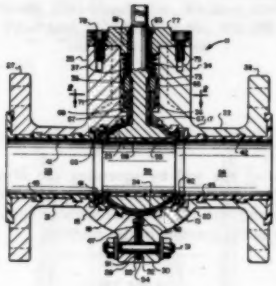
Filed Aug. 30, 1985, Ser. No. 771,191
Int. Cl.[4] F16L *7/00*
U.S. Cl. 137—375 **11 Claims**

1. A valve, which comprises:

a valve body including a pair of separably body parts connected together at a junction, each of said body parts including a plastic liner with each of said liners including a sealing flange positioned adjacent said junction, said valve body including a chamber disposed between a pair of flow conduits and a stem passageway between said chamber and the exterior of said valve body, each of said body parts including axially aligned body flanges extending outwardly of said sealing flanges, each of said body flanges including axially aligned abuttment surfaces facing each other, said abuttment surfaces being positioned outwardly of said sealing flanges, at least one of said abutt-

ment surfaces including an axially extending rim abuttable with the other of said abuttment surfaces to form a substantially rigid valve body when said body parts are connected together;

resilient means for urging said sealing flanges into sealing engagement with each other;



a plastic encapsulted valve member positioned within said valve body;

a plastic encapsulated stem connected to said valve member and extending through said stem passageway;

and means for sealing between said stem and said stem passageway.

4,696,324

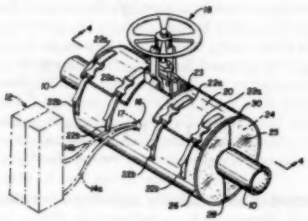
HEAT FOAM INSULATION JACKET

Dennis A. Petronko, 1490 Redfern Dr., Pittsburgh, Pa. 15241

Filed Oct. 2, 1986, Ser. No. 914,379

Int. Cl.[4] F16L *7/00*

U.S. Cl. 137—375 **9 Claims**



1. A multi-layered, unitary, removable, and reuseable thermal insulating jacket for pipe accouterments, valves, and the like, which comprises:

(a) a generally rectangular outer layer, said outer layer fabricated out of a flexible, non-shrinkable, non-elastic heat and water-resistant material and having two sides and two ends;

(b) a generally rectangular inner layer fabricated out of a flexible, heat-shrinkable plastic material, having two sides and two ends, and joined to said outer layer by a seam which extends around the perimeter of the inner layer, said inner layer adapted to conform to the shape of the pipe accouterment, valve or the like upon heating;

(c) a central transverse seam joining said inner and outer layers and extending from side to side of said jacket to form two sully-enclosed, independent pockets between said inner and outer layers;

(d) a middle layer of rigid-cell polyurethane foam contained within said pockets; and

(e) means to secure said jacket around the pipe accouterment valve or the like whereby said pockets are positioned on opposite sides of said pipe accouterment, valve or the like with said inner layer positioned immediately adjacent thereto.

4,696,325

SENSING OF FIRE INSTALLATION WATER VALVES BEING CLOSED

Anthony J. Magee, 1 Curdies Street, East Bentleigh, Victoria 3165, Australia

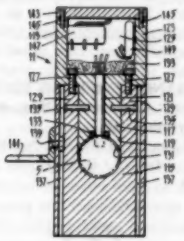
PCT No. PCT/AU85/00156, § 371 Date Mar. 6, 1986, § 102(e) Date Mar. 6, 1986, PCT Pub. No. WO86/00970, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 18, 1985, Ser. No. 847,655

Claims priority, application Australia, Jul. 18, 1984, PG6074; Sep. 4, 1984, PG6928

Int. Cl.[4] F16K *37/00*

U.S. Cl. 137—552 **6 Claims**



1. A method of modifying a water supply gate valve for a fire installation so that said valve can provide an alarm when said valve is closed, said method comprising:

(a) attaching appropriate magnetic material to a part of said valve which moves when the gate of said valve moves;

(b) fixedly mounting a first magnetically operable sensor relative to said vlave, externally of a valve chamber of said valve, wherein said first sensor is mounted in a housing and wherein said housing includes a second sensor for sensing if a lid of said housing is opened; and

(c) connecting a signal emitting alarm to said first sensor, said mounting of said first sensor being at a positon where it will cooperate with said appropriate magnetic material such that when said valve is open, no signal will be emitted but when said valve is closed, a signal will be emitted, said first sensor being of the type which does not require power to be supplied thereto to place it into a magnetic sensing condition for use.

4,696,326

ANTI-MISMATCH SYSTEM

James L. Sturgis, 11860 W. 91st St., Overland Park, Kans. 66214

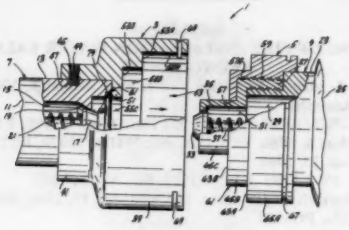
Filed Jun. 5, 1986, Ser. No. 870,929

Int. Cl.[4] F16L *37/28*

U.S. Cl. 137—614.04 **16 Claims**

1. For use in connecting a plurality of pairs of fluid conduits wherein each pair comprises matching first and second conduits comprising interengageable valve components at respective ends of the conduits, an anti-mismatch system for preventing the inadvertent connection of mismatched fluid conduits, said system comprising a plurality of sets of anti-mismatch fittings, each set including a first anti-match fitting formed for detachable connection with respect to the valve component of the first fluid conduit of each of said pairs of matching fluid conduits and a second anti-mismatch fitting formed for detachable connection with respect to the valve component of the second fluid conduit of each of said pairs of matching fluid conduits, the first and second anti-mismatch fittings of each set being formed to surround their respective conduit ends and

being uniquely configured for interengagement only with one another and not with anti-mismatch fittings of different sets



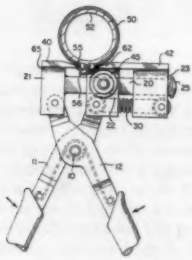
thereby to enable connection only of matching first and second fluid conduits.

4,696,327

BAND FINISHING TOOL

Wayne B. Wolcott, Englewood, Ohio, assignor to Electro Adapter, Chatsworth, Calif.

Filed Jun. 18, 1986, Ser. No. 875,579
Int. Cl.[4] B21F *15/00*
U.S. Cl. 140—150 **7 Claims**



1. Apparatus for folding the free end of a band back over a band buckle, comprising:

(a) a scissors assembly including a pair of handles and a pair of operating arms pivotally interconnected for movement toward and away from each other,

(b) complementary means on said arms for gripping the opposite ends of the buckle in line with the band end, and

(c) means on one of said arms responsive to movement of said arms toward each other for bending the band end into overlying relation with the buckle.

4,696,328

SPILLAGE PREVENTION

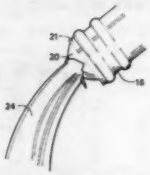
Harold B. Rhodes, Jr., 1805 Wilton Rd., Leucadia, Calif. 92024

Filed Aug. 11, 1986, Ser. No. 895,123
Int. Cl.[4] B65D *47/10*
U.S. Cl. 141—1 **2 Claims**

1. A method of pouring liquid into a machine through an opening in the machine without spilling the liquid outside of the opening in the machine, comprising the steps of

(a) providing the liquid in a bottle made of a flexible material that may be squeezed to decrease the interior volume of the bottle, and having an elongated neck terminating in an opening that is wide enough to enable viscous liquid to pour freely therethrough from the bottle when the bottle is tilted, said bottle including an airtight seal secured to the perimeter of the neck and closing the opening for preventing liquid from being poured from the opening when the bottle is tilted, wherein the seal is rupturable upon pressure being exerted thereon by the contents of the bottle when the bottle is squeezed;

(b) tilting the bottle and inserting the neck of the tilted bottle into the opening of the machine; and



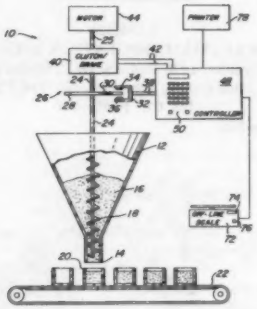
(c) rupturing the seal by squeezing the tilted bottle and thereafter pouring the liquid from the tilted bottle by gravity and into the machine without spilling the liquid outside of the opening of the machine.

4,696,329

FEEDBACK CONTROL FOR AUTOMATIC FILLING MACHINE

Anthony J. Izzi, Malvern, Pa., assignor to Mateer Burt Co., Inc., Wayne, Pa.

Filed Jun. 9, 1986, Ser. No. 872,367
Int. Cl.[4] B65B *1/12*
U.S. Cl. 141—1 **22 Claims**



14. Method of automatically adjusting a preselected volume of material dispensed by a volumetric filling machine into containers to be filled by weight, comprising the steps of

(a) sequentially weighing a plurality of containers each containing the preselected volume of material dispensed by the volumetric filling machine, generating an equal plurality

(b) sequentially generating an equal plurality of weight signals representative of the weight of the dispensed material in the containers,

(c) receiving the sequential weight signals and determining whether the weight signals are within preselected tolerance limits,

(d) rejecting weight signals outside the preselected tolerance limits and storing signals within the preselected tolerance limits in a memory,

(e) calculating from the stored sequential weight signals an average weight value and range value equal to the difference between the maximum stored sequential weight signal and minimum sequential weight signal,

(f) comparing the average weight value to a preselected weight value,

(g) generating a correction signal representative of the comparison, and

(h) adjusting the preselected volume by an amount sufficient

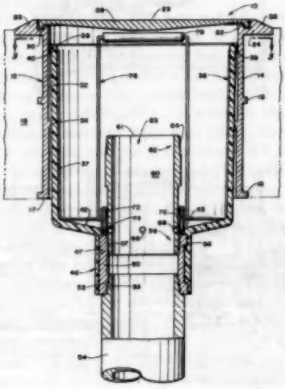
to cause the average weight to be equal to the preselected weight value.

4,696,330

SPILL COLLECTOR ASSEMBLY FOR LIQUID STORAGE VESSELS

Charles J. Randman, 877 Peri Ct., Redding, Calif. 96001, and Philip E. Smith, 2781 Rancho Dr., Redding, Calif. 96002

Filed Aug. 14, 1986, Ser. No. 899,180
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—86 31 Claims



1. A liquid spill collector assembly for attachment to the inlet pipe of a storage vessel comprising:

a stationary outer housing having a top opening;

a receptacle mounted for at least axial movement within said housing having an open top portion with a side wall merging into a bottom wall and a lower drain outlet in communication with said inlet pipe, said housing having an inner wall surface with at least a part of said receptacle side wall in slidable engagement with said inner wall surface;

an upstanding center pipe secured within said drain outlet and positioned to block access to said outlet from said receptacle, said center pipe having passageways permitting access to said outlet; and,

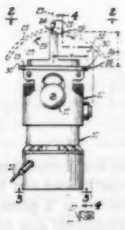
valve means for controlling access to said passageways.

4,696,331

FIXTURE FOR A ROUTER

Thomas E. Irland, 5118 Artistic Cir., Colorado Springs, Colo. 80917

Filed Jun. 19, 1986, Ser. No. 875,888
Int. Cl.[4] B27C *5/10*
U.S. Cl. 144—134 D 2 Claims



1. Apparatus comprising:

a router housing having a front surface with an outer edge thereon;

a finishing tool having a cylindrical guide surface on one end thereof disposed around a longitudinal axis of said finishing tool, said finishing tool having a cutting edge thereon adjacent to said cylindrical guide surface;

means for selectively holding the other end of said finishing tool;

means disposed at least partially within said housing for selectively rotating the holding means and the finishing tool about the longitudinal axis of the finishing tool;

fixture means for permitting said one end of said finishing tool to be movable along a radius edge of a countertop for trimming an edge off of such countertop, said fixture means including a base member adapted to be attached to said front surface of said router housing and a central flange rigidly connected to said base member and extending from said base member toward said one end of said finishing tool, an opening disposed in a central portion of said base member and extending through a central portion of said central flange, said central flange having a rounded front end thereon adjacent to the cutting edge of said finishing tool, the distance of said rounded front end of said central flange from said front surface of the router housing being greater than the distance of the outer edge of said front surface of the router housing from the longitudinal axis of said finishing tool, whereby there will be a clearance between the outer edge of the front surface of the router housing and the countertop when the rounded front end of the central flange is moved along the radius edge of the countertop while the cylindrical guide surface is on top of the countertop and the cutting edge trims off a portion of the top front edge of the countertop; and

means for connecting said fixture means to the front surface of said router housing.

4,696,332

ELASTOMER FREE GRID REINFORCEMENT OF PRESSURABLE ELASTOMER REPAIRED ARTICLES

Russell W. Koch, Hartville, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 718,666, Apr. 1, 1985, Pat. No. 4,618,519, which is a continuation-in-part of Ser. No. 584,426, Feb. 28, 1984, abandoned, and a continuation-in-part of Ser. No. 767,998, Apr. 21, 1985, abandoned, which is a continuation of Ser. No. 584,426, Feb. 28, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 872,311
Int. Cl.[4] B60C *21/00*
U.S. Cl. 152—367 11 Claims

1. A repaired elastomer article; comprising:

the elastomer article, said elastomer article being cured and capable of being pressurized, said elastomer article having a hollow therein, said hollow having a repair material therein, said article having an interior hollow surface area,

an elastomer free grid, said grid located on said article interior surface area and traversing said interior hollow area, said grid adhered to said article interior by an amine curable polymer or prepolymer, and

a rubber patch, said patch having reinforcement therein, said patch residing on said amine adhered grid.

4,696,333

RIM FOR A PNEUMATIC VEHICLE TIRE

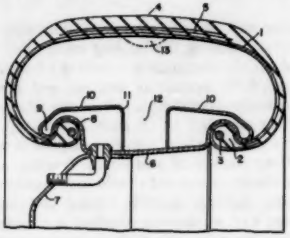
Heinz-Dieter Rach, Garbsen, and Udo Frerichs, Langenhagen, both of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Apr. 25, 1986, Ser. No. 856,587
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1985, 3515320
Int. Cl.[4] B60C *17/04*
U.S. Cl. 152—379.3 8 Claims

1. A rim of pneumatic vehicle tire, the bends of which are

adapted to be mounted on the radially inner periphery of the rim; said rim comprises:

a rim ring that includes wall means and that is provided with seating surfaces on the radially inward side for said tire beads; axially outwardly of said seating surfaces, said wall means of said rim ring is bent to form respective rim



flanges that extend essentially radially inwardly; said rim flanges then being bent axially inwardly and then radially outwardly, and then, at a radial spacing from the bead seating surfaces of said rim ring, said rim flange extends axially inwardly, so that two annular support surfaces are provided for supporting said tire when the latter is no longer properly inflated.

4,696,334

DEFLATING DEVICE FOR PNEUMATIC TIRES OF VEHICLES

Robert le Chatelier; André Sinic, both of Paris, and Jean-Jacques Diefenbach, Sannois, all of France, assignors to Precision Mecanique Labinal, France

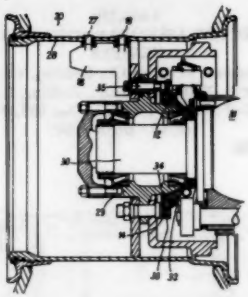
Filed Feb. 18, 1986, Ser. No. 630,268

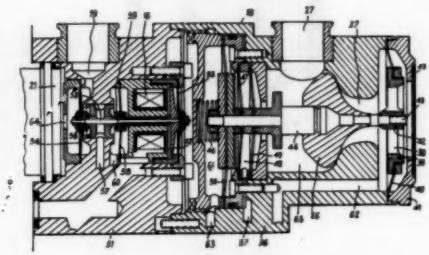
Claims priority, application France, Feb. 18, 1985, 85 02296; Sep. 3, 1985, 85 13059

Int. Cl.[4] B60C *23/00, 29/00*

U.S. Cl. 152—417 **28 Claims**

1. A device for deflating tires of wheels of a vehicle, and in particular a rapid intervention vehicle or a military vehicle having a chassis, adapted to permit, by means of a centralized control, an extremely rapid deflation of the tires of the wheels of the vehicle, said device comprising, on each wheel having a tire to be deflated, a servovalve having a large-section passage directly connected to the tire and capable of instantaneously putting the tire in communication with the open air, an electrovalve associated with the servovalve for causing the closure of the servovalve, a pressure sensor responsive to the pressure of the tire, and an electrical circuit associated with the sensor and connected to the electrovalve, said device further comprising, in the region of each of said wheels, an electromagnetic coupling element constituted by a rotating transmitter having a primary winding which is fixed relative to the chassis of the vehicle and a secondary winding which is mounted on the wheel and is rotatable without contact with the primary winding and in facing relation to the primary winding and connected to the electrovalve for causing the opening of the servovalve and connected to the electrical circuit associated with the sensor, which electrical circuit is so adapted and arranged that, when the pressure detected by the sensor reaches a predetermined low value, the electrical circuit causes the closure of the servovalve, a source of electrical current, and power supply lines connecting the source to the primary windings of the rotating transmitters associated with the various wheels.





4,696,335

PNEUMATIC RADIAL TIRE

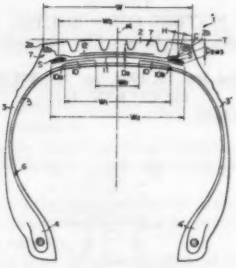
Tetsuhito Tsukagoshi, Kodaira; Tamotsu Matsunuma, Urawa, and Shigeo Makino, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Jul. 31, 1985, Ser. No. 760,876

Claims priority, application Japan, Aug. 7, 1984, 59-165435

Int. Cl.[4] B60C *9/18, 9/28*

U.S. Cl. 152—535 **8 Claims**



1. A pneumatic radial tire comprising a tread portion extending circumferentially thereabout and having a mid-circumferential centerline contained in a plane which is substantially perpendicular to the rotational axis of the tire, a pair of side portions, a pair of bead portions, a carcass disposed between the tread portion and the carcass portion;

said belt portion being constituted by at least a pair of first belts, a second belt through a (n−1)th belt and a nth belt which are arranged from radially inward to outward, the n being a natural number not less than 4;

said first belt, second belt through said (n−1)th belt and said nth belt having a first series of parallel cords, a second series of parallel cords through a (n−1)th series of parallel cords and a nth series of parallel cords embedded therein, respectively;

said first belts being capable of resisting in the directions of said cords a tensile force of between 970 and 2150 kg per a length of 25.4 mm of said first belt measured in the direction substantially perpendicularly passing through said parallel cords thereof;

said second belt through (n−1)th belt and nth belt having belt widths W_2 through W_{n-1} and W_n, respectively, which are reduced from said second belt to said nth belt;

a (k−1)th belt and the lateral end of a kth belt being radially spaced apart a distance D_{k-1*k} defined by an equation $D_{k-1*k}/D_{k-2*k-1}=\beta(W_k/W_{k-1})$ wherein the k is a number arbitrarily selected from 4 to said n, the W_k is a width of the kth belt, and the β is between 0.3 and 1.0;

said first belts being laterially spaced apart a predetermined lateral space symmetrically with respect to the mid-circumferential centerline and said cords thereof being disposed at an angle of between 40 to 60 degrees with respect to the mid-circumferential centerline;

said spaced-apart first belts having opposite laterally outer ends which are located laterally inwardly within less than 5 percent of the belt width W_3 of said third belt from the corresponding opposite lateral ends of said third belt, respectively;

said first series of the cords of said first belt and said second series of the cords of said second belt being oriented in same directions with respect to said mid-circumferential centerline; and

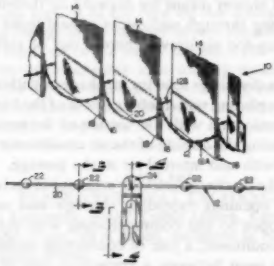
two adjacent sets of the cords of two adjacent belts of between the second and kth belts being oriented in opposite directions with each other with respect to said mid-circumferential centerline.

4,696,336

VERTICAL BLINDS CHAIN

John A. Dixon, 9576 Ledge Acres Rd., Macedonia, Ohio 44056

Filed Jan. 27, 1986, Ser. No. 823,188
Int. Cl.[4] E06B *9/38*
U.S. Cl. 160—178 R **5 Claims**



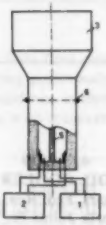
1. A chain for attachment to a vertical blind, comprising a longitudinally extending length of thread, a plurality of plastic clips fixedly secured to said length of thread at spaced intervals, each of said plastic clips having a means for engaging a portion of a vertical blind, each of said plastic clips having a portion completely circumscribing a respective portion of said thread, a plurality of plastic objects fixedly secured to said length of thread at a plurality of locations spaced between said clips, each of said plastic objects completely circumscribing its respective location on said thread, each of said plastic clips and said plastic objects being integrally molded to said length of thread.

4,696,337

APPARATUS FOR ANTICIPATION OF STRUCTURE OF CASTING ALLOYS AND PARTICULARLY THE DEGREE OF SPHEROIDIZATION OF CAST IRON

Tadeusz Grochal, Wieliczka; Roman Ryglicki, and Wojciech Wierzchowski, both of Cracow, all of Poland, assignors to Instytut Odlewnictwa, Cracow, Poland

Filed Oct. 17, 1986, Ser. No. 920,561
Claims priority, application Poland, Oct. 31, 1985, 256069
Int. Cl.[4] B22D *2/00, 27/02, 46/00*
U.S. Cl. 164—150 **2 Claims**



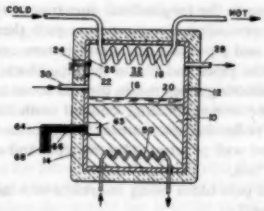
1. Apparatus for anticipation of the structure of casting alloys and, particularly, the degree of spheroidization of cast iron, the apparatus comprising a cylindrical casting mould having a mould cavity and provided with a cylindrical pouring cup having a cross sectional area greater than that of the mould cavity; a first vertical wall which divides the mould cavity into two equal halves; a second vertical wall which divides one of the two equal halves into two equal parts, the first and second vertical walls having a height less than the height of the mould cavity; electrodes built in the bottom of the mould and projecting into each of the two equal parts delimited by the second vertical wall; a supply system connected to suitable electrodes; and a measuring system connected to suitable electrodes.

4,696,338

LATENT HEAT STORAGE AND TRANSFER SYSTEM AND METHOD

Eric A. Jensen, Salt Lake City, Utah; James Hitchin, Del Mar, Calif.; Albert G. Tsai, San Diego, Calif., and Gustaf O. Arrhenius, La Jolla, Calif., assignors to Thermal Energy Stroage, Inc., San Diego, Calif.

Continuation of Ser. No. 382,971, Jun. 1, 1982, abandoned. This application Mar. 6, 1985, Ser. No. 708,669
Int. Cl.[4] F28D *21/00*
U.S. Cl. 165—1 **28 Claims**



8. The method of latent and sensible heat storage and transfer comprising (1) providing a body of hot, molten crystallizable phase change heat storage material in a closed container containing about 5% by weight, water or other protic solvent of said heat storage material, (2) disposing a body of volatile

liquid-vapor phase change heat transfer material that is significantly admissible in said heat storage material in liquid state in direct contact with said molten heat storage material, (3) crystallizing portions of said heat storage material to release heat of crystallization for vaporizing portions of said body of heat transfer material, (4) maintaining the vapor pressure of heat transfer material in said container sufficiently high to retain portions of said heat transfer material in liquid state in contact with said body of heat storage material and (5) recovering latent and sensible heat by condensing vaporized heat transfer material, said heat transfer material having a boiling point of the vapor pressure in said container during heat recovery not higher than the crystallization temperature of said heat storage material.

4,696,339

OIL COOLER

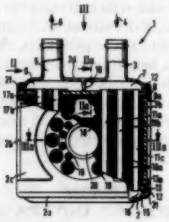
Gebhard Schwarz, Stuttgart, Fed. Rep. of Germany, assignor to Suddeutsche Kuhlerfabrik Julius Fr. Behr, GmbH & Co. KG, Stuttgart, Fed. Rep. of Germany

Filed Oct. 30, 1985, Ser. No. 793,123

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440064

Int. Cl.[4] F28D *7/00;* **F28E** *9/16*

U.S. Cl. 165—51 **11 Claims**



1. An oil cooler arrangement for an internal combustion engine which is interposable between an engine and an oil filter, comprising:

housing chamber means for housing said oil cooler having a rectangular box-shaped center part,

a ribbed pipe block tightly held in the box-shaped center part, said pipe block including a plurality of parallel pipes connected to one another by continuous ribs extending transverse to the longitudinal direction of the pipes,

said pipes providing a coolant flow path therethrough for cooling said pipes and ribs which in turn cool oil flowing around the pipes and ribs in the pipe block, and

coolant collecting space means formed at one end of the pipe block for communicating coolant with the pipes, said coolant collecting space means being formed by a coolant space end wall penetrated by the pipes and a hood-shaped coolant box,

said ribbed pipe block being insertable into said box-shaped center part,

said box-shaped center part including a side wall and an integral flanged edge for clampingly holding the ribbed pipe block in assembled condition, said flanged edge extending over a portion of said coolant box to clamp said coolant space end wall between said coolant box and said side wall.

4,696,340

AIR CONDITIONER

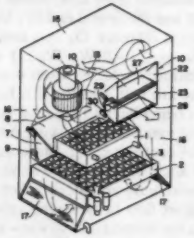
Teruyuki Nagao; Yuji Kawamura, and Koichi Kashima, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1986, Ser. No. 882,529

Claims priority, application Japan, Jul. 8, 1985, 60-149625

Int. Cl.[4] F25B *29/00*

U.S. Cl. 165—58 **5 Claims**



1. An air conditioner comprising:

an outer casing;

an inner casing mounted within said outer casing and spaced therewithin from said outer casing for defining an internal air intake passage between said inner casing and said outer casing; said inner casing having an inlet open to and communicating with said internal air intake passage, and said inner casing having an outlet;

at least one heat exchanger mounted within said inner casing between said inlet and said outlet thereof;

blower means having an intake hole open to and communicating with said outlet of said inner casing and a discharge hole, said blower means for drawing air thereto from said inner casing through said outlet of said inner casing and for forcing the air drawn thereto out of said discharge hole; and

an air intake-discharge selector mechanism within said outer casing for placing said discharge hole of the blower means in communication with the outside of the air conditioner while placing the outside of the air conditioner in communication with said internal air intake passage,

said air intake-discharge selector mechanism including a pair of outer openings extending through said outer casing thereby open to and communicating with the outside of the air conditioner, a pair of connecting passages each of which is open between a respective one of said outer openings and said internal air intake passage, a pair of shutters each of which is movably mounted over a respective one of said connecting passages for moving over and away from said connecting passages to respectively close and open said connecting passages thereby selectively communicating said outer openings with said internal air intake passage, and synchronizing means for moving one of said pair of shutters over the respective connecting passage thereof as the other of said pair of shutters moves away from the respective connecting passage thereof.

4,696,341
DEVICE FOR CHANGING THE NUMBER OF PART STREAMS OF A FLOWING MEDIUM

Ulf Bolmstedt, Staffanstorp, and Björn-Olow Johansson, Lomma, both of Sweden, assignors to Alfa-Laval Food and Dairy Engineering AB, Tumba, Sweden

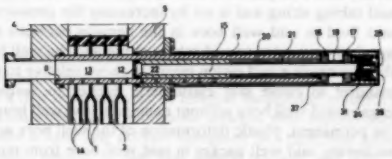
PCT No. PCT/SE86/00224, § 371 Date Jan. 7, 1987, § 102(e) Date Jan. 7, 1987, PCT Pub. No. WO86/07418, PCT Pub. Date Dec. 18, 1986

PCT Filed May 14, 1986, Ser. No. 12,130

Claims priority, application Sweden, Jun. 11, 1985, 8502875

Int. Cl.[4] F28F *7/02*

U.S. Cl. 165—101 **4 Claims**



1. A device for changing the number of part streams of a flowing medium, comprising a tube (7) with a plurality of holes (11) through the tube wall arranged one after the other in the length direction of the tube, a piston (12), which divides the interior of the tube into a first compartment (13), through which the medium is intended to flow, and a second compartment (14), which is closed from the first compartment (13), and a piston rod (15), which extends from the piston (12) through the second compartment (14) and with an end portion extends a distance outside the tube (7), the number of part streams being determined by the number of holes (11) through the tube wall communicating with the first compartment (13), characterized by

a first stop member (16), which is arranged axially displaceable on the end portion of the piston rod (15) extending out from the tube (7) and which is adapted to abut against an end surface of the tube (7),

a second stop member (17), which is arranged to keep the first stop member (16) axially pressed against said end surface of the tube, and

a determined number of sleeve members (18–21) of different axial extension, which are removably applied one after the other around the piston rod (15) within the tube (7) and which together have such an axial extension that they serve as spacing means between the piston (12) and said first stop member (16), when the latter is pressed against said end surface of the tube by the second stop member (17), a change of the number of part streams being possible by at least one of the sleeve members (19–21) being movable to and clampable as a spacing means in a position between the two stop members (16, 17), and the remaining sleeve members being clampable between the piston (12) and the first stop member (16).

4,696,342
PLATE-TYPE HEAT EXCHANGER

Yoshiyuki Yamauchi, Aichi; Toshio Ohara, Kariya, and Toshio Takahashi, Oobu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

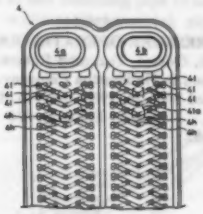
Filed Jun. 24, 1986, Ser. No. 877,730

Claims priority, application Japan, Jun. 28, 1985, 60-143373

Int. Cl.[4] F28D *1/02*

U.S. Cl. 165—152 **8 Claims**

1. A plate-type heat exchanger comprising a stack of flat fluid flow tubes each composed of a pair of confronting core plates joined to each other and defining a fluid flow pass therebetween, each of said core plates having an inlet hole for introducing a fluid into said fluid flow pass and an outlet hole for discharging the fluid from said fluid flow pass, said core plate having a plurality of ribs on an inner wall surface thereof which project into said fluid flow pass, said ribs on each of said pair of core plates being grouped in plural rows along said fluid pass and being held in contact with the confronting ribs of at least two rows on the other core plate, so that there is no



rib-free line along said fluid flow pass, and one end of each of said ribs in one row being positionally displaced from one end of an adjacent one of said ribs in another row along said fluid flow pass, so that there is no transverse rib-free line across the fluid flow pass.

4,696,343
WIRELINE DUMP BAILER

Richard V. Anderson, Arlington, and Wendall D. Carnes, Bedford, both of Tex., assignors to S.I.E., Inc., Fort Worth, Tex.

Filed May 23, 1986, Ser. No. 866,589

Int. Cl.[4] E21B *33/132*

U.S. Cl. 166—164 **8 Claims**

1. A dump bailer adapted to be lowered on a wireline into a well for placing a slurry on a retainer positioned in the well, comprising in combination:

a tubular housing;

a weight bar carried in the housing for axial movement relative thereto between upper and lower positions;

means for mounting an electrically ignited detonator to the bottom of the weight bar;

port means for introducing the slurry into the housing below the weight bar and for immersing the detonator in the slurry when the weight bar is in the upper position;

means for electrically connecting the detonator to the wireline to ignite the detonator;

a plug releasably inserted into the lower end of the housing to retain the slurry in the housing when the weight bar is in the upper position; and

shear means for allowing the plug to be expelled from the

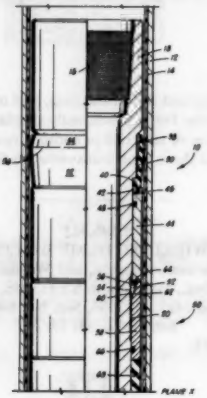
housing due to the explosive force of the detonator when ignited transmitting a shock wave through the slurry, allowing the weight bar to move to the lower position to push the slurry from the housing.

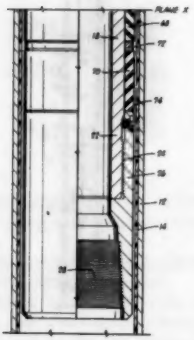
4,696,344

ANNULUS PRESSURE OPERATED RATCHET DEVICE

Theron A. Scott, Odessa, Tex., and Robert T. Evans, Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Nov. 25, 1985, Ser. No. 801,898
Int. Cl.[4] E21B *33/126*
U.S. Cl. 166—182 **8 Claims**





1. A tubing conveyed, hydraulically set, slipless well packer for sealing a well bore having fluid therein without damage to the well bore or the permanent, plastic deformation of the well bore, said well packer being adapted to be attached to a tubing string to be used in said well bore, said well packer comprising:

a mandrel having one end thereof connected to said tubing string;

an elastomeric packer disposed about said mandrel, said elastomeric packer capable of sealingly engaging said well bore without damage to the well bore or the permanent, plastic deformation of the well bore while anchoring said well packer in said well bore from movement therein;

ratchet means associated with said mandrel adjacent said elastomeric packer for maintaining said elastomeric packer in a compressed condition responsive to activation of said ratchet means wherein said elastomeric packer sealingly engages said well bore without damage to the well bore or the permanent, plastic deformation of the well bore while anchoring said well packer in said well bore from movement therein; and

piston means associated with said mandrel and being slidable along the axis thereof responsive to fluid pressure in the annulus between said mandrel connected to said tubing string and the well bore, said ratchet means being activated responsive to such piston means sliding relative to said mandrel to compress said elastomeric packer into sealing engagement with said well bore without damage to the well bore or the permanent, plastic deformation of the well bore while anchoring said well packer in said well bore from movement therein;

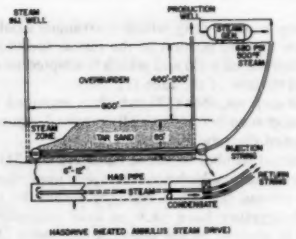
whereby said well packer is conveyed into said well bore on said tubing string and is set by increasing the pressure of said fluid in said well bore in the annulus between said mandrel connected to said tubing string and the well bore thereby causing said piston means to move relative to said mandrel to cause said elastomeric packer to sealingly engage said well bore without damage to the well bore or the permanent, plastic deformation of the well bore while anchoring said well packer in said well bore from movement therein, said elastomeric packer being maintained in sealing engagement with said well bore by said ratchet means.

4,696,345

HASDRIVE WITH MULTIPLE OFFSET PRODUCERS

Limin Hsueh, Buena Park, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 21, 1986, Ser. No. 898,549
Int. Cl.[4] E21B *43/24, 43/30*
U.S. Cl. 166—245 **4 Claims**



HASDRIVE HEATED ANNULUS STEAM DRIVE)

1. In the method of recovering viscous petroleum from a petroleum-containing formation comprising:

(a) providing a steam injection well from the earth's surface through the formation,

(b) extending at least one lateral hole from the vicinity of the steam injection well through at least a portion of the formation,

(c) forming a flow path in the hole isolated from the formation for flow of fluid through the formation,

(d) circulating a hot fluid through the flow path to reduce the viscosity of the viscous petroleum in the formation adjacent the outside of the flow path to form a communication path for flow of petroleum in the formation outside of the flow path, and

(e) injecting a driving fluid into the formation through the steam injection well and the communication path to promote flow of petroleum in the formation to production wells penetrating the petroleum-containing formation for recovery from the formation,

The Improvement Comprising

having at least two of the production wells offset from the flow path by from 2% to 8% the distance from the steam injection well.

4,696,346

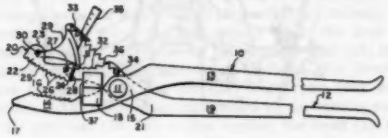
FARRIER'S TOOL

Michael K. Ryan, 111 W. 9th #143, Clovis, Calif. 93612

Filed Sep. 2, 1986, Ser. No. 902,496

Int. Cl.[4] A01L *11/00*

U.S. Cl. 168—45 **4 Claims**



1. A multi-functional adjustable hand tool useful in attaching shoes to the hooves of horses, comprising:

(a) a first lever member of integral monolithic construction comprised of an elongated straight first handle portion and a fixed jaw portion elongated in a direction substantially parallel to said first handle portion, said fixed jaw and handle portion being joined by a transition portion diagonally disposed to said fixed fixed jaw and handle portion,

(b) a second lever member comprised of an elongated straight second handle portion and an adjustable jaw, said adjustable jaw and second handle portion being joined by a transition portion diagonally disposed to said second handle portion and adjustable jaw,

(c) said first and second lever members being interconnected by first pivot means in said transition portions, whereby the handle portions and jaws of both lever members are in facing relationship, the jaws representing the forward extremity of the tool,

(d) said adjustable jaw being comprised of: (1) a gripping arm having upper and lower extremities and a toothed forward surface, and second pivot means which join said lower extremity to said second lever member adjacent the transition portion thereof in a manner permitting movement of said gripping arm toward and away from said fixed jaw, (2) a positioning arm interengaged by third pivot means with the upper extremity of said gripping arm and rearwardly directed therefrom, and having a downwardly directed holding edge, (3) a series of holding grooves in said second lever member adapted to selectively engage said holding edge, thereby determining the spacing of the gripping arm with respect to the fixed jaw, (4) spring means adapted to urge said positioning arm downwardly to expedite secure engagement of said grooves by said holding edge, and (5) manipulating means attached to said positioning arm and extending upwardly and rearwardly therefrom, permitting manipulative movement of the position arm against the urging of said spring means, and

(e) cutting means associated with said fixed and adjustable jaws.

4,696,347

ARRANGEMENT FOR PROPULSION LIQUIDS OVER LONG DISTANCES

Michael Stolov; Sara Stolov; Adi Stolov, and Ilana Stolov-Hecht, all of 25 Hapoel Street, Nof-Yam, Herzlia 46 105, Israel

Filed Feb. 18, 1986, Ser. No. 830,473

Claims priority, application Israel, Feb. 4, 1986, 77783

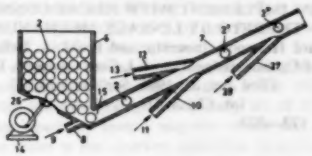
Int. Cl.[4] A62C *17/00, 19/00;* **F42B** *11/24, 13/14*

U.S. Cl. 169—46 **20 Claims**

1. An arrangement for propelling substances in large quantities over long distances, comprising

a substance to be propelled in large quantities over long distances, said substance being in the form of a plurality of spheres, each sphere having a generally spherical form with a plurality of dimples on the outer surface thereof;

a launching pipe having a first inlet means for continuously receiving said spheres, a second inlet means for feeding compressed gas to said launching pipe to drive spheres of said substance within said launching pipe and therethrough, and an outlet through which said spheres are driven by the compressed gas;



a mechanical feeder for feeding the spheres to said first inlet of said launching pipe;

means for feeding highly compressed gas to said second inlet of said launching pipe;

whereby a jet of said spheres is thrown out through the outlet of said pipe at a high velocity in the desired direction, the dimples on said spheres allowing the substance to reach long distances.

4,696,348

POWER RAKE

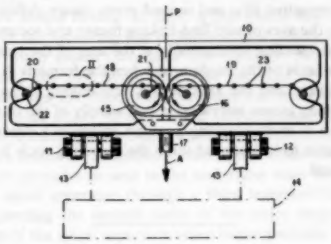
Boris Novoselsky, 66-01 110th St., Apt. 1B, Forest Hills, N.Y. 11375

Continuation-in-part of Ser. No. 720,260, Apr. 5, 1985, Pat. No. 4,596,113. This application Feb. 13, 1986, Ser. No. 830,052

The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.

Int. Cl.[4] A01B *33/06*

U.S. Cl. 172—102 **15 Claims**



1. A power rake which comprises:

a support displaceable over the ground in a travel direction;

at least one member mounted on said support for cyclical displacement with at least a component of said displacement being transverse to said travel direction;

an array of mutually-spaced tines mounted on said member and engageable with the ground;

respective means journaling each of said tines on said member for swingable displacement between two limiting positions relative to said member about a respective pivot axis transverse to said member and to the ground;

respective stops on said member engageable with said tines in each of said positions whereby said tines are each swung into one of said positions by movement of said member and engagement of the tine with the ground during at least part of each cycle of displacement of said member and are swung into the other position upon move-

ment of said member along another part of each cycle of displacement of said member; and

drive means connected to said member for cyclically displacing same relative to said support.

4,696,349

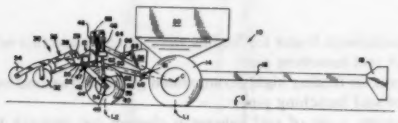
FARM IMPLEMENT WITH FRAME CONNECTED THERETO BY LINKAGE MECHANISM

J. Richard Harwood, Innerkip, and Frank A. Bell, Hamilton, both of Canada, assignors to J. I. Case Company, Racine, Wis.

Filed Jan. 31, 1986, Ser. No. 824,413

Int. Cl.[4] A01B *63/11, 63/22*

U.S. Cl. 172—323 **4 Claims**



1. A farm implement supported by transversely spaced wheels, said implement having a frame pivotally connected thereto rearwardly thereof by a linkage mechanism, said frame having soil-engaging tools mounted thereon, wheel means mounted on said frame for raising and lowering said frame relative to the ground between transport and working positions, said linkage mechanism comprising: first-linking means connected at spaced opposite-end portions thereof by respective first and second pivot means pivotally linking the frame to the implement with a line interconnecting said respective first and second pivot means defining a first axis; second-linking means connected at spaced opposite-end portions thereof by respective first and second pivot means pivotally linking the frame to the implement with a line intersecting said last mentioned respective first and second pivot means defining a second axis; the axes of said first-linking means and second-linking means intersecting substantially at the axis of the transversely spaced wheels of the implement when the frame is in its transport position; and the axes of said first-linking means and second-linking means intersecting rearwardly of the frame when the frame is in its working position to cause a downwardly-acting force to be imposed upon the engaging tools for engaging the soil.

4,696,350

MOTOR GRADER WITH SADDLE MOUNTED TO TRANSVERSE PIN ON MAIN FRAME

Martin L. Ruhter; Dennis A. Brimeyer, and David W. Stubben, all of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Sep. 25, 1985, Ser. No. 780,048

Int. Cl.[4] E02F *3/80*

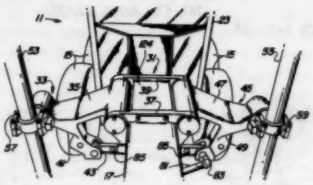
U.S. Cl. 172—793 **4 Claims**

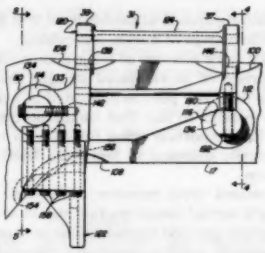
1. In a motor grader having a fore-and-aft extending main frame, a saddle comprising:

an upper portion having a generally longitudinal extending section joining spaced apart forward and rear facings, said facings having a generally vertical orientation;

said main frame having a first pin and a second pin mounted transversely in the main frame in longitudinal spaced apart relationship; and

said forward facing straddling said main frame and fixably mounted to opposite ends of said first pin, and said rear





facing straddling said main frame and fixably mounted to opposite ends of said second pin.

4,696,351

ASSEMBLY ROBOT WITH REACTION ABSORBING PLATFORM

Laszlo S. Horvah, Geneva, Switzerland, assignor to C O D Inter Techniques SA, Geneva, Switzerland

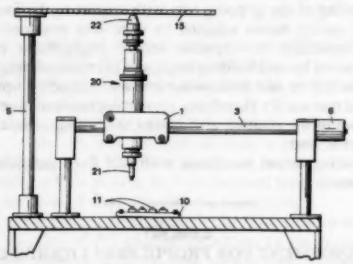
PCT No. PCT/CH84/00132, § 371 Date Apr. 23, 1985, § 102(e) Date Apr. 15, 1985, PCT Pub. No. WO85/01003, PCT Pub. Date Mar. 14, 1985

PCT Filed Aug. 22, 1984, Ser. No. 726,893

Claims priority, application Switzerland, Aug. 26, 1983, 4691/83

Int. Cl.[4] B21J *13/04*

U.S. Cl. 173—32 **10 Claims**



1. An assembly robot for assembling parts comprising an assembly tool, a part holder (10) for the parts (11) in an assembly area and a head (1) carrying the assembly tool (21), wherein the head is movable with respect to the part holder by means of guiding supports (3, 4) and is positioned by motors (6), and wherein the head carries a device (20) for enabling application of the tool (21) to a part (11) with a predetermined force, and at least one platform (15, 16) mounted independently of said guiding supports and said head for absorbing the reaction to the force applied by said device, said device including

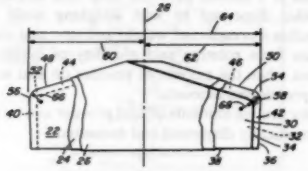
a bearing part (22) placed in such a manner that the head (1) is between the platform (15, 16) and the part holder (10), said platform being mechanically coupled to the part holder by rigid elements (5) located outside an open space defined between the assembly area and the platform (15, 16) so as to be capable of withstanding a pushing force tending to push the platform away from the supports, and wherein the bearing part (22) is movable with respect to the head in the direction of said pushing force, and wherein said device further includes a jack constructed to move the tool axially while the head (1) is immobile, and to exert a force between the tool (21) and the bearing part (22) independently of the head, this latter force being transmitted by the tool (21) to the part (11), and the reaction to this force being transmitted by the bearing part (22) to the platform (15, 16) so that neither the head (1), nor its guiding supports (3, 4) are subjected to the force or to the reaction to this force.

4,696,352

INSERT FOR A DRILLING TOOL BIT AND A METHOD OF DRILLING THEREWITH

Sergej-Tomislav Buljan, Acton, and J. Gary Baldoni, Walpole, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 17, 1986, Ser. No. 840,309
Int. Cl.[4] E21B *10/46*
U.S. Cl. 175—57 **22 Claims**



1. A method of drilling a hole in a hard material such as rock, coal, masonry, concrete, and the like comprising:

positioning a drilling tool having a drilling tool bit insert comprising a shaped substrate formed of a hard, fracture resistant material and coated with one or more thin adherent layers of refractory coating material, the material of each layer comprising a composition independently selected from the group consisting of carbides, nitrides, and carbonitrides of titanium, hafnium, vanadium, tantalum, and niobium, and oxides of aluminum and zirconium, and mixtures and solid solutions thereof;

rotating the drilling tool bit insert at a sufficient rate and applying sufficient thrust to the drilling tool bit insert to drill the hole in the hard material.

4,696,353

DRILLING MUD CLEANING SYSTEM

Steven A. Elmquist, North Ridgeville, and Leonard E. Boesger, Aurora, both of Ohio, assignors to W. S. Tyler, Incorporated, Mentor, Ohio

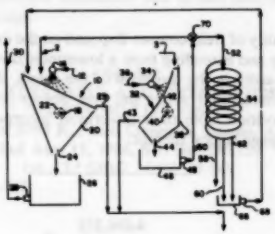
Filed May 16, 1986, Ser. No. 863,760
Int. Cl.[4] E21B *7/18*
U.S. Cl. 175—206 **2 Claims**

1. A mud cleaning system for removal of drill cuttings and recovery of drilling mud coming from an oil well, where the mud slurry may be made up essentially of barite particles having a specific gravity of 4.2 or more and a particle size mostly under 200 mesh, drill cuttings having a specific gravity of 2–3, and varying particle sizes ranging from 200 mesh to ¼ inch or more, and water; said system comprising:

a. a first screen means having a top end and a bottom end and a screen member extending therebetween having a plurality of openings therein, said first screen means adapted to receive at its top end the mud slurry from the well and to discharge an overflow slurry comprising oversize drill cuttings at the bottom while passing an underflow mud slurry containing substantially all of the barite particles that may be present in the mud through the plurality of openings in the screen member, the screen member of said first screen means comprising a sieve bend having openings near the top end thereof sized to pass material having a topsize ranging from 1/6 inch to ¼ inch and openings near the bottom end thereof sized to pass material having a topsize ranging from 35 to 65 mesh;

b. first sump means for collecting the underflow mud slurry passing through the plurality of openings in the screen member of said first screen means;

c. a spiral separator having an upper end having an inlet for receiving the underflow mud slurry, a lower end having an outlet for discharging substantially all of the barite particles separately from a majority of the drill cuttings and the water in the received underflow mud slurry, and a spiral chute interconnecting the upper and lower ends of the spiral separator along which the received underflow



mud slurry flows thereby effectuating the separation of substantially all of the barite particles from the slurry;

d. second sump means for collecting the drill cuttings and the water passing from the spiral separator;

e. second screen means for receiving and dewatering a slurry;

f. valve means having an inlet, a first outlet and a second outlet for receiving the underflow mud slurry from the first sump means through a first transport line interconnecting the first sump means to the inlet of the valve means and for selectively directing the received underflow mud slurry to the second screen means through a second transport line interconnecting the first outlet of the valve means to the second screen means when there are no barite particles present in the underflow mud slurry or to the spiral separator through a third transport line interconnecting the second outlet of the valve means to the inlet of the spiral separator when barite particles are present in the underflow mud slurry; and

g. a fourth transport line interconnecting the second sump means to the second screen means.

4,696,354

DRILLING BIT WITH FULL RELEASE VOID AREAS

William W. King, and Edmund C. Houle, Jr., both of Houston, Tex., assignors to Hughes Tool Company - USA, Houston, Tex.

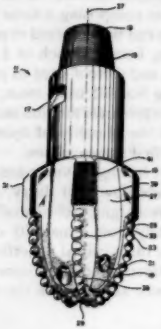
Filed Jun. 30, 1986, Ser. No. 880,214
Int. Cl.[4] E21B *10/60*
U.S. Cl. 175—329 **6 Claims**

1. A bit for use in drilling earthen formations, comprising:

a body including a bit face on one end and a shank on the opposite end with means for connection to a drill string for rotation about a longitudinal axis, the bit body having a tubular bore which communicates with an interior bore of the drill string for circulation of fluids, the bit face

increasing in external diameter in the direction of the shank to form a gage region of the bit;

at least one fluid opening communicating the bit face with the tubular bore for circulating fluid to the bit face; and



a plurality of fluid courses disposed on the exterior of the bit body and extending from a lowermost downhole location upwardly in the direction of the shank, the fluid courses becoming ever wider and ever deeper along their entire disposition from their lowermost incorporation through the gage region thereof.

4,696,355

DRILLING TOOLS

August Haussmann, Oberzell, Fed. Rep. of Germany, assignor to Hawera Probst GmbH & Co., Ravensburg, Fed. Rep. of Germany

Filed Jan. 6, 1986, Ser. No. 816,577

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1985, 3500202

Int. Cl.[4] E21B *10/36, 10/44*

U.S. Cl. 175—395 **5 Claims**

1. A drilling tool in combination with a carbide cutting tip for percussion drilling machines, said drilling tool having a longitudinal dimension and a cutting end and said carbide cutting tip being inserted into said cutting end of said tool and being secured to said tool, said tool having a cylindrical surface interrupted only by double helical fluting which is terminated at the vicinity of said cutting end, in two diametrically opposed flute runout surfaces extending substantially parallel to the longitudinal dimension of said tool, wherein said runout surfaces are in mirror symmetry to a second plane parallel to the longitudinal dimension of said tool, and said cutting tip extends substantially perpendicularly to the second plane.

4,696,356

GUN POWDER DISPENSING AND MEASURING APPARATUS

Dolores D. Ellion, and Max E. Ellion, both of 2152 Highland Oaks Dr., Arcadia, Calif. 91006

Continuation-in-part of Ser. No. 688,220, Jan. 2, 1985. This application Jan. 14, 1986, Ser. No. 818,723

Int. Cl.[4] G01G *13/02, 23/10*

U.S. Cl. 177—123 **20 Claims**

1. A dispensing apparatus for dispensing a precise amount of powder to a scale comprising:

a plurality of rotatable barrel means for dispensing said powder;

electric drive means for rotatably driving said plurality of barrel means; said electric drive means being constructed to drive said plurality of barrel means at an independently variable rotational rate from one another;

weighing scale means;

opto-electronic sensing means mounted on said weighing scale electronically sensing the weight measurement on said weighing scale means as said powder is being dispensed;

electronic circuit means for receiving the output from said opto-electronic sensing means and controlling the electric drive means for rotatable driving said plurality of barrel means at a first faster net flow rate and for switching said electronic drive means to rotate said plurality of barrel means at a second slow net flow rate as the amount of powder dispensed to said weighing scale means approaches a preselected weight and stop said electric drive means from rotating said plurality of barrel dispensing means when the amount of powder on said scale reaches the preselected amount;

whereby precise amounts of said powder can be rapidly and automatically dispensed and measured.

4,696,357

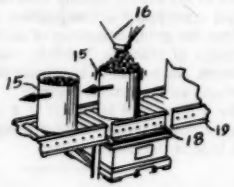
PACKER/WEIGH-SCALE

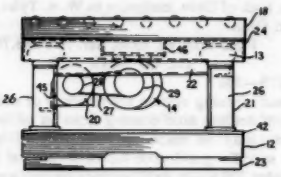
David E. Beehler; Timothy E. Drake, and Timothy E. Hawk, all of Westfield, N.Y., assignors to Renold, Inc., Westfield, N.Y.

Filed May 27, 1986, Ser. No. 867,148

Int. Cl.[4] G01G *19/00, 21/10*

U.S. Cl. 177—145 **8 Claims**





1. A packer/weigh-scale made up of a scale platform, a vibrator attached to said scale platform adapted to vibrate said scale platform in a vertical plane only,

an upper frame,

resilient means supporting said an upper frame on said scale platform,

a scale base,

at least one load cell supported on said scale base,

flexible tension means supporting said upper frame on said load cell whereby vibrations from said vibrator are transmitted to said scale in a vertical plane only, whereby material supported on said upper frame will be vibrated.

4,696,358

WEIGHING A NUMBER OF OBJECTS IN SUCCESSION

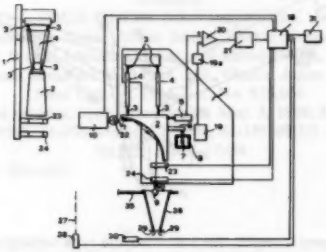
Eryk S. Doerman, 45 Cromwell Road, London SW7 2ED; William J. Turner, 83 Twyford Road, Harrow, Middlesex HA2 0SJ; David A. Homer, 35 Keble Road, Maidenhead, SL6 6BB; Andrew D. G. Stewart, The Old Rectory, Ashampstead, Reading, Berkshire, and Ian Clarke, 63 High Street, Thames Cottage, Wargrave, Berkshire, all of England

Filed Nov. 15, 1985, Ser. No. 798,298

Claims priority, application United Kingdom, Nov. 16, 1984, 8428976

Int. Cl.[4] G01G *19/00, 23/00;* **G01N** *3/08*

U.S. Cl. 177—145 **26 Claims**



1. Apparatus for weighing a number of discrete objects in spaced succession, comprising:

a reaction member having an object-contacting surface; means for directing each object in succession along a substantially predetermined engagement trajectory intersecting said object-contacting surface, whereby the object strikes said object-contacting surface and the line of travel of the object is changed through an angle substantially greater than 0° and substantially less than 180° by engagement of the object with the reaction member; and means for giving a signal which varies with the dynamic reaction of the reaction member to the impact thereon of the object.

4,696,359

ELECTRONIC WEIGHING APPARATUS

Albert W. Glibbery, Upland, Calif., assignor to National Transducer Corporation, Rancho Cucamonga, Calif.

Filed Aug. 22, 1986, Ser. No. 899,487

Int. Cl.[4] G01G *3/14;* **G01L** *1/22*

U.S. Cl. 177—211 **15 Claims**

1. A weighing apparatus comprising:

force responsive strain gauge means providing an electrical output;

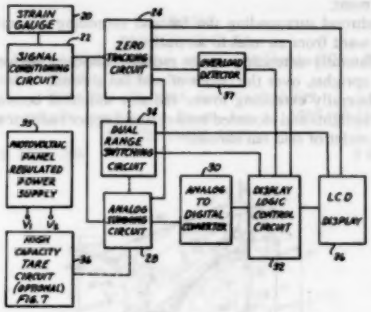
said force responsive strain gauge means having a high impedance;

sample and hold circuit means receiving the output from said force responsive transducer means for sampling and holding said output;

sequencing means for sequentially turning said force responsive strain guage means and said sample and hold means on and off;

digital processing means for processing the output of said sample and hold means;

display means for displaying the output of said digital processing means; and



low voltage power supply means supplying power to said force responsive transducer and to said sample and hold circuit means.

4,696,360

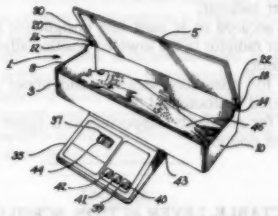
WEIGHING APPARATUS AND METHOD FOR USE IN WEIGHING LIVE FISH

Manny Homen, 5798 E. Paseo Cimarron, Tucson, Ariz. 85715

Filed Aug. 11, 1986, Ser. No. 895,129

Int. Cl.[4] G01G *21/22, 23/00*

U.S. Cl. 177—262 **13 Claims**



1. A weighing apparatus for use in weighing live fish, comprising:

a container means having a base member for accommodating therein said live fish;

a cover member means for swingably coupling thereabove said container means;

a guide member means for coupling therebelow said base member; and

a weighing scale means for slidably coupling thereabove said container means, said guide member means is suitable for guiding said container means when said container means is slidably mounted thereabove said weighing scale means.

4,696,361

SWING-UP RADIATOR AND OIL COOLER ASSEMBLY

Brian C. Clark, and Michael D. Jines, both of Owatonna, Minn., assignors to Owatonna Manufacturing Company, Owatonna, Minn.

Continuation of Ser. No. 592,720, Mar. 23, 1984, abandoned. This application Apr. 22, 1986, Ser. No. 858,072

Int. Cl.[4] B60K *11/04*

U.S. Cl. 180—68.4 **12 Claims**

1. In combination with a skid steer loader including a frame defining a ventilated engine compartment with an engine located between a pair of laterally spaced-apart opposing up-

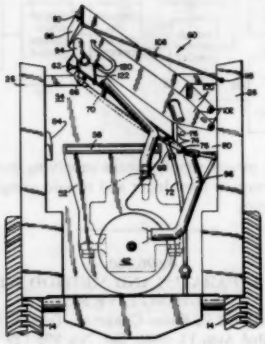
rights behind an operators compartment, a cooling system comprising:

a fan located between the engine and the operators compartment;

a shroud surrounding the fan and extending generally upward from an inlet to an outlet;

a laterally extending upper radiator disposed between the uprights, over the outlet of said fan shroud;

a laterally extending lower radiator mounted between the uprights and mounted between said upper radiator and the outlet of said fan shroud;



means for supporting said upper radiator for pivotal movement between raised and lowered positions relative to said lower radiator;

means secured to at least one upright for supporting said upper radiator in the lowered position adjacent said lower radiator;

means for releasably securing said upper radiator in the lowered position; and

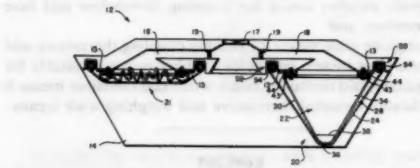
means for releasably supporting said upper radiator in the raised position.

4,696,362

RETRACTABLE, LEVER ACTION, SCROLL SEAL FOR A SURFACE EFFECT SHIP

Fred W. Wilson, Mt. Airy, and Timothy D. Smith, College Park, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 24, 1986, Ser. No. 831,952
Int. Cl.[4] B60V *1/16*
U.S. Cl. 180—116 **38 Claims**



1. A seal for a Surface Effect Ship, comprising:

an inflatable inner seal member, affixed to and depending from the hull of the Surface Effect Ship, disposed between the sidehulls, and in physical communication therewith;

means for inflating said inner seal member; and, an outer seal member, composed of a flexible sheet material, scrollably affixed to the ship hull fore and aft of said inner seal member, said outer seal member retractably enclosing said inner seal member in cooperation with said ship hull and sidehulls;

wherein said means for inflating said inner seal member comprises;

a source of pressurized air,

conduit system means for providing fluid communication between said source of pressurized air and said inner seal member and,

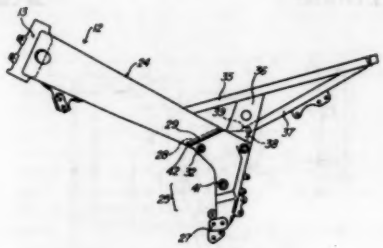
valve means for regulating the flow of air between said source of pressurized air and said inner seal member, disposed within said conduit system means, for inflating and deflating said inner seal member.

4,696,363

MOTORCYCLE FRAME

Ryuichi Enda, Iwata, Japan, assignor to Yamaha, Japan

Filed Aug. 6, 1986, Ser. No. 893,670
Claims priority, application Japan, Aug. 7, 1985, 60-173830
Int. Cl.[4] B62K *19/22*
U.S. Cl. 180—219 **6 Claims**



1. A frame assembly for a motorcycle type vehicle comprising a head pipe adapted to dirigibly support a front wheel, a pair of main frame members affixed at their forward ends to said head pipe and diverging rearwardly therefrom, said main frame members extending downwardly from said head pipe to their rear ends, a pair of engine and rear wheel supporting members each affixed to a respective rear end of said main frame members, a seat rail affixed to said main frame members forwardly of the connection of said main frame members to said engine and rear wheel supporting member and extending rearwardly and upwardly from their point of attachment to said main frame members, and supporting bracket means affixed to said engine and rear wheel supporting member and extending upwardly therefrom, said seat rails being supported by said supporting bracket means intermediate the ends of said seat rails.

4,696,364

POWER-UNIT SUPPORT STRUCTURE OF MOTORCYCLE

Shigenaga Enoki; Kazuya Yoshio, and Nobuo Yamaguchi, all of Asaka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1985, Ser. No. 782,106
Claims priority, application Japan, Dec. 26, 1984, 59-278772
Int. Cl.[4] B60K *5/12*
U.S. Cl. 180—228 **13 Claims**

1. A power unit support structure of a motorcycle having a power unit and a frame structure including a support member having a tubular end portion terminating in conjunction with said power unit, which comprises:

an elongated swing member positioned between said power unit and said tubular end portion and having a first end thereof pivotally connected with said power unit;

a pivot support assembly for pivotally supporting said elongated swing member on said support member; and

an elastic damper element accommodated within said tubular end portion and coupled with a second end of said swing member.

4,696,365

FOUR WHEEL DRIVE VEHICLE

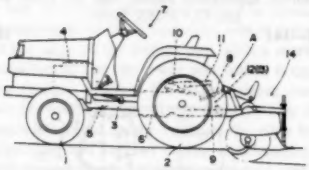
Shozo Ishimori, Sakai; Mikio Ishida, Osaka; Hiroyuki Miki, Sakai; Seiichi Ishiizumi, Sakai, and Kazuo Hirata, Sakai, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Oct. 30, 1986, Ser. No. 925,066

Claims priority, application Japan, May 2, 1986, 61-102716; Sep. 1, 1986, 61-205445; Sep. 2, 1986, 61-135208[U]

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—233 **7 Claims**



1. A four wheel drive vehicle comprising;

an engine,

a transmission case housing a main propelling drive transmission,

front wheels and rear wheels driven by the engine, the front wheels being dirigible,

front wheel drive transmission means connected to the main transmission for effecting changeover between a first four wheel drive mode in which the front wheels and the rear wheels are driven at a substantially equal peripheral speed and a second four wheel drive mode in which the front wheels are driven at a higher peripheral speed than the rear wheels,

said front wheel drive transmission means including a first transmission mechanism for effecting the first four wheel drive mode, a second transmission mechanism for effecting the second four wheel drive mode, and clutching means, said clutching means having a first clutch for operatively connecting the first transmission mechanism to the front wheels, a second clutch for operatively connecting the second transmission mechanism to the front wheels, a hydraulically operable piston movable between a position to disengage the first clutch and engage the second clutch and a position to engage the first clutch and disengage the second clutch, and a spring for biasing the piston toward the position to engage the first clutch and disengage the second clutch, and

hydraulic control means for actuating the piston and including a control valve mechanically interlocked to a steering section of the vehicle.

4,696,366

MOTORCYCLE

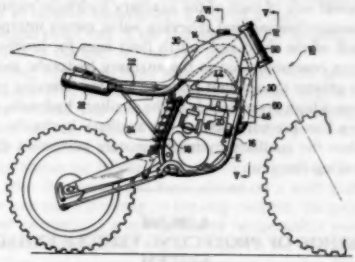
Shigeru Hattori, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1985, Ser. No. 815,109

Claims priority, application Japan, Jan. 11, 1985, 60-2163

Int. Cl.[4] B60K *13/04*

U.S. Cl. 180—296 **1 Claim**



1. A motorcycle comprising a main frame and cross pipes extending from a head pipe toward the rear of a vehicle body, a fuel tank mounted to said main frame in such mode that said fuel tank can be mounted to and dismounted from the side of said vehicle body, and an exhaust pipe disposed along said main frame at the same level as said fuel tank, said exhaust pipe having an upper portion positioned on a longitudinal vertical center plane of said motorcycle, said fuel tank being divided into left and right fuel tank sections mounted to said main frame from the left and right sides, respectively, of said vehicle body, and the opposed inside walls of said respective fuel tank sections are recessed and protruded so as to embrace said exhaust pipe disposed along said main frame, said main frame and said cross pipes therebetween.

4,696,367

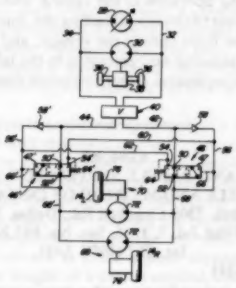
AUXILIARY HYDROSTATIC DRIVE SYSTEM

Larry M. Delfs, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Feb. 5, 1986, Ser. No. 826,459

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—306 **8 Claims**



1. An auxiliary drive system for a vehicle having a pair of main drive wheels, a pair of steerable wheels, a main reversible hydraulic motor, variable ratio transmission means for interconnecting the main hydraulic motor with the main drive wheels, a variable displacement, reversible delivery pump, and

first and second fluid lines interconnecting opposite sides of the main motor with opposite sides of the pump, the auxiliary drive system comprising:

a pair of reversible auxiliary hydraulic motors, each individually connected to one of the pair of steerable wheels;

a directional control valve having first and second ports communicated with opposite sides of the pump and having third and fourth ports for communicating with the auxiliary drive motors;

a third fluid line communicating the third port with a first side of each of the auxiliary hydraulic motors;

a fourth fluid line communicating the fourth port with a second side of each of the auxiliary hydraulic motors; and

a pressure-limiting and relieving valve means interposed in each of the third and fourth fluid lines for limiting pressures communicated to the auxiliary hydraulic motors to no greater than a limit pressure and for relieving pressure from a high pressure side of the auxiliary hydraulic motors to a low pressure side of the auxiliary hydraulic motors when the auxiliary hydraulic motors perform a dynamic braking function.

4,696,368

METHOD OF PROTECTING VEHICLE EXHAUST SYSTEM

Gene S. Hummel, and Mark L. Hummel, both of Baltimore, Md., assignors to Humco, Inc., Baltimore, Md.

Filed Mar. 14, 1986, Ser. No. 839,637
Int. Cl.[4] F01N *1/02*
U.S. Cl. 180—309 **3 Claims**

1. A method of preventing acces to the interior of the exhaust system by a terrorist via the tailpipe of a vehicle having an internal combustion engine, comprising the steps of

sliding a one-piece ruggedized, tight fitting tubular metal extension of at least sixteen gauge steel having an open inlet end and a ruggedized integral grate enclosure of at least 16 gauge steel at the opposite outlet end thereof, onto the tailpipe such that exhaust gases will flow from the grate during operation of the vehicle wherein the tailpipe is impervious to objects exceeding the dimensions of holes in the grate from outside the vehicle, and

irreversibly securing said extension to the tailpipe by means to prevent separation thereof by other than extraordinary force.

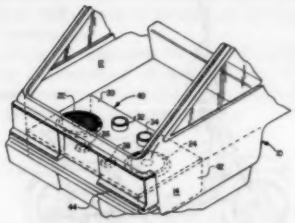
4,696,369

SPEAKER AND BAFFLE SYSTEM FOR A VEHICLE STORAGE WELL AND METHOD OF INSTALLING SAME

Gregg W. Dodrill, 7308 Campbell Rd., Dallas, Tex. 75248

Filed Jul. 7, 1986, Ser. No. 882,226
Int. Cl.[4] H05K *5/00*
U.S. Cl. 181—141 **3 Claims**

1. A speaker system for use with a storage well formed in the rear floor of a vehicle, said speaker system comprising an enclosure dimensioned to fit within said well with minimum clearance and enclosing a fixed volume of air; said enclosure including a baffle extending over said well and flush with said floor; at least one loudspeaker mounted on said baffle and extending through a corresponding opening formed through said baffle for interacting with said volume of air; and means



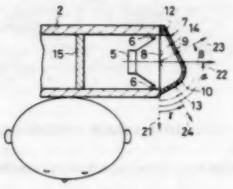
for venting said enclosure a predetermined amount to optimally tune said speaker to said volume of air.

4,696,370

HEADREST-MOUNTED ACOUSTIC DEVICE

Akio Tokumo; Kazunori Takagi, and Shuichi Mori, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 25, 1985, Ser. No. 801,994
Claims priority, application Japan, Nov. 30, 1984, 59-253218
Int. Cl.[4] H05K *5/00*
U.S. Cl. 181—141 **10 Claims**



1. An acoustic device comprising:

a headrest having at least a first hollow inner portion at a side portion thereof, said headrest being mounted on top of a seat;

at least a first speaker mounted within said first hollow portion of said headrest, a sound radiating direction of said speaker being substantially parallel to the central axis of said headrest;

a cover mounted outside said headrest in the sound radiating direction of said first speaker, said cover having a front surface, side surfaces, and reflecting surface, said surfaces being so connected as to form a chamber with said first speaker, said front surface having an axis of orientation which is at an angle other than normal to said sound radiating direction; and

a sound radiating part for altering a frequency response characteristic of said first speaker, said sound radiating part being constituted by an opening in said front surface and having an area substantially smaller than an area which is defined by the diameter of said speaker, said frequency response charcteristic being altered in accordance with the area of said sound radiating part.

4,696,371

BRIDGE BOTTOM INSPECTION APPARATUS

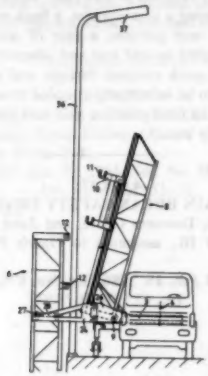
Alfons Moog, Untersiggingen 100, 7774 Deggenhausertal 3, Fed. Rep. of Germany

Filed Mar. 19, 1985, Ser. No. 714,016

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 3410952

Int. Cl.[4] E04G 3/10

U.S. Cl. 182—63 17 Claims



1. An improved bridge bottom inspection apparatus with an operating chassis which stands on the bridge and which is movable adjacent a barrier along the edge of the bridge, with a raisable and lowerable lift tower which is operatively retained and supported by the chassis and which extends downwards past the edge of the bridge, and with a work platform which is attached to the lift tower and which is cantilevered beneath the bridge, wherein the improvement comprises: a guide tower (8) which is operatively supported by the chassis (1) and which is located on the inside of the edge barrier (34) of the bridge (32); and support means, overhanging the edge barrier, said support means having cantilevered members with free ends and cradle means at the free ends to releasably mount said lift tower (6) on the guide tower, the support means being movable upward and downward on the guide tower.

4,696,372

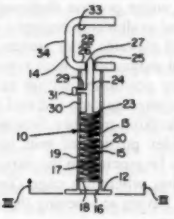
PORTABLE STEP AND CARRYING DEVICE FOR STUD WALLS

Tom R. Fields, 5714 Verner Oak Ct., Sacramento, Calif. 95841

Continuation of Ser. No. 626,766, Jul. 2, 1984, abandoned. This application Apr. 28, 1986, Ser. No. 856,947

Int. Cl.[4] E04G 3/00

U.S. Cl. 182—92 6 Claims



1. A portable step-forming device releasably attachable to a vertical wooden stud of an open studwall to form a step usable in performing work on or about the studwall, comprising:

a U-shaped gripping member having two opposed prongs lying parallel to each other in a first general plane, the two prongs being spaced apart slightly more widely than the thickness of a stud, with a bight portion joining the prongs at one end to form the U-shaped member so that a stud can be closely received in the U-shaped member between the prongs;

a step member fixedly attached to an outer side of one prong of the gripping member so that it extends perpendicularly from the prong and lies in said first generaly plane with the two prongs, the step member being of a length sufficient to receive transversely a foot of a user;

an enlarged outer end of the step member for helping retain the foot of the user on the step member;

each prong having an inner stud-facing side with generally linear, parallel, spaced apart upper and lower edges which define second and third planes, one at each prong, the second and third planes being substantially perpendicular to the first plane and parallel to each other;

gripping means for holding the step-forming device in position after the device has been placed on a wall stud and prior to a user's stepping on the step member, the gripping means comprising a spring-loaded reciprocable member having a stud-engaging end and wherein the step member is hollow and contains the reciprocable member for sliding movement therein with the stud-engaging end extending through an opening in said one prong;

whereby, with the step-forming device retained in position on a stud by the gripping means, when the user's weight is applied to the step member the step-forming device tends to tip or pivot on the wooden stud, causing the lower edge of one prong and the upper edge of the other prong to press into the wooden stud and to tightly grip the stud, preventing slipping of the device as the weight of the user is carried, and whereby the step-forming device may be placed on a stud, from the same side of the studwall, to extend the step member to the right.

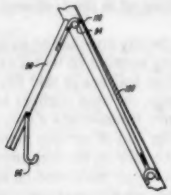
5. A method for providing a temporary step on an open studwall for use by a worker performing work at out-of-reach heights on or near the studwall, comprising;

providing a portable step-forming device having a U-shaped gripping member with two opposed prongs lying parallel to each other in a first general plane, with a bight portion joining the prongs at one end; a step member fixedly attached to an outer side of one prong so that it extends perpendicularly from the prong and lies in said first general plane with the two prongs; each prong having an inner stud-facing side with generally linear, parallel, spaced apart upper and lower edges which define second and third planes, one at each prong, the second and third planes being substantially perpendicular to the first plane and parallel to each other; and with a gripping means for holding the step-forming device in a selected position on a wall stud against slippage down the stud, the gripping means comprising a spring-loaded reciprocable member having a pointed tip for engaging the side of the wooden stud;

placing the portable step-forming device at a desired level on a vertical wall stud of a studwall open at least at one side, with the stud closely received between the two prongs and including manually retracting the reciprocable member against the spring when placing the step-forming device on the stud, then releasing the reciprocable member to let the pointed tip engage the stud to hold the step-forming device in place against slippage down the stud until the weight of a user is applied; and

stepping on the step member and applying the weight of the user to the step member, thereby tending to slightly tip or pivot the step-forming device on the wooden stud and causing the edges of the prongs to press into the wooden stud a and to tightly grip the stud, preventing slipping of the step-forming device as it carries the weight of the user.

4,696,373
TWO-POSITION LADDER PLATFORM
Gerald R. Page, 8 Price St., Hopkinton, Mass. 01748
Filed Jul. 25, 1986, Ser. No. 890,164
Int. Cl.[4] E06C *7/16*
U.S. Cl. 182—121 **6 Claims**



1. A support device to be attached to a ladder and capable of being placed in an erected position and a recessed position, respectively, comprising:

a platform section with first and second sides;

at least one platform hook mounted pivotally along said first side of said platform section and designed to be suspended and to engage a first rung of said ladder; and

leg sections mounted along said first and second sides of said platform section, each leg section further comprising:

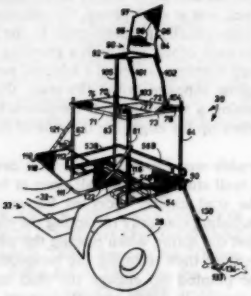
a mounted portion affixed to said platform section,

an arm section connected to said mounted portion and including a terminal end distal said mounted portion, and

a fork hook adjustably connected to said terminal end of said arm section and wherein said fork hook is extensibly adjustable with respect to said arm section to engage a second rung of said ladder, said second rung located below said first rung, and wherein

said leg section is adapted to permit said platform section to move from said erected position to said recessed position by moving said platform section toward said ladder while said platform section passes over said first rung, and said fork hooks rotate around the axis of and remain in substantial contact with said second rung.

4,696,374
ATV HUNTING STAND
John E. Hale, 5423 Maple St., North Little Rock, Ark. 72118
Filed Oct. 31, 1986, Ser. No. 925,616
Int. Cl.[4] A01M *31/02*
U.S. Cl. 182—127 **8 Claims**



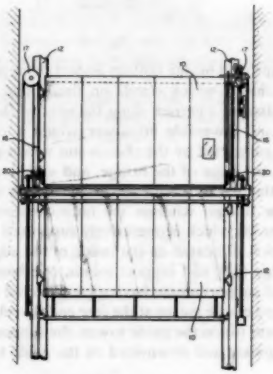
1. A portable, foldable, hunter stand adapted to be retrofitted to all terrain vehicles (ATV's) such as three-wheelers, four-wheelers, or the like; said stand comprising:

a plurality of support stanchions coupled to a conventional rear deck associated with said ATV ; said support stanchions user foldable between generally horizontal and vertical positions relative to said ATV;

a chair support plate operatively foldably coupled to the front ones of said stanchions and adapted to be semi-permanently elevated thereby in generally horizontal, parallel spaced apart relation with respect to said rear deck; said support plate including a plurality of quick connect fittings; and,

a chair deployable in either generally flat transportation position or a vertically elevated operational position, said chair foldably coupled to said chair support plate and said chair comprising a seat portion, a back rest foldably coupled to said seat portion, a pair of seat support struts foldably coupled to said seat and adapted to quickly connect to said quick connect fittings, and a front stabilizer leg adapted to be selectively coupled to said support plate and adapted to firmly secure said seat portion above said seat support plate.

4,696,375
CHAIN BREAK SAFETY DEVICE
Ronald Matthews, Downers Grove, and John J. Jecmen, Oak Brook, both of Ill., assignors to Harris Preble Company, Chicago, Ill.
Filed Jun. 16, 1986, Ser. No. 874,581
Int. Cl.[4] B66B *13/00*
U.S. Cl. 187—58 **15 Claims**



1. A chain break safety device adapted for use with a vertically moving, bi-parting, counter-balanced elevator door system, said device adapted to be attached to an elevator door, said chain break safety device comprising:

a block having a vertically-disposed, tapered opening therein, said tapered opening defined by a vertical surface and a tapered surface, said opening having a wider portion and a narrower portion, said tapered opening being oriented with its wider portion disposed downwardly, said opening adapted to slideably engage a static vertical frame member of said elevator door system, said block having limited vertical moveability with respect to said door;

a braking member positioned within said tapered opening, between said tapered surface and said static vertical frame member, said braking member dimensioned to fit loosely within the wider portion of said tapered opening, but dimensioned to be pinched in the narrower portion of said tapered opening, wherein a cage comprises a vertically disposed plate having an opening therein to surround said braking member;

said cage maintains said braking member within said tapered opening;

means to connect said block to said counter-balance mechanism of said elevator door system;

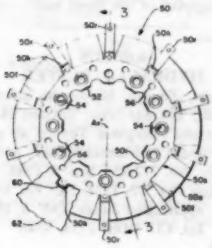
a resilient member, adapted to be deflected by tension of said counter-balance system, whereby said deflection causes said block to move upwardly with respect to said door, thus positioning said braking member in the wider portion of said tapered opening, but upon removal of said tension, said resilient member adapted to recover from its deflected position and cause said block to slide downwardly, positioning said braking member in the narrower portion of said tapered opening and pinching said braking member between said tapered surface and said static vertical frame member.

4,696,376

CONFIGURATION FOR A DISK BRAKE TORQUE TUBE

Daniel S. Reynolds, Canal Fulton, Ohio, assignor to Loral Corporation, New York, N.Y.

Filed Apr. 30, 1986, Ser. No. 859,282
Int. Cl.[4] F16D *55/36*
U.S. Cl. 188—71.5 **4 Claims**



1. In a wheel and brake assembly having an inboard end and an outboard end as determined by a brake housing at the inboard end, the brake assembly including a plurality of disk elements comprising a brake disk stack wherein various ones of the stack are keyed for rotation with the wheel while various alternate ones are keyed to be relatively stationary to effect braking of the wheel when the disk stack is compressed in the axial direction of the assembly, said wheel being mounted for rotation about an outboard end of a wheel axle having an inboard end affixed to the brake housing;

a torque tube adapted for stationary mounting to the brake housing and coaxial about the wheel axle and in keyed engagement with the alternate ones of the brake disk stack and comprising:

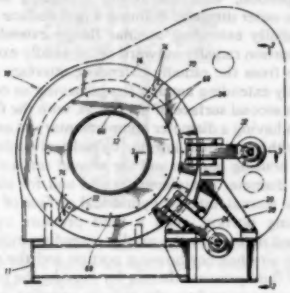
a substantially cylindrical body having an open outboard end and a substantially closed inboard end, the inboard end having an axial bore of sufficient diameter for receiving the wheel axle therethrough and having a plurality of radially located axial holes each of which receives a bolt to effect mounting of the torque tube to the brake housing, the cylindrical body having an outward-facing peripheral surface characterized by a plurality of key surfaces for engagement with the alternate ones of the brake disk stack and each said key surface extends longitudinally from the inboard end to the outboard end and terminates at the outboard end in a transition radius which meets a rib extending radially therefrom and the cylindrical body between adjacent key surfaces extends into a radially extending flange which is at least in part outboard of said key surfaces and which is annularly continuous about the outboard end of the body and each said radially extending rib and radially extending flange of the cylindrical body between adjacent ribs define a T-section at the outboard extent of each said key.

4,696,377

BRAKE SYSTEM FOR DRAWWORKS

Eugene M. Richardson, Pasadena; Norbert O. Brehm, Friendswood, and Larry G. Null, Pasadena, all of Tex., assignors to LTV Energy Products Company, Dallas, Tex.

Filed Sep. 27, 1985, Ser. No. 781,400
Int. Cl.[4] F16D *65/24*
U.S. Cl. 188—170 **6 Claims**



1. A safety brake mechanism for a drawworks comprising:

a caliper disc brake system comprising:

a rotor mounted on a drum barrel on said drawworks;

a first spring actuated caliper assembly mounted on said drawworks such that it can engage said rotor to stop rotation of said drum barrel, said first assembly being biased such that it lightly engages a first side of said rotor during normal operation;

a second spring actuated caliper assembly mounted on said drawworks such that it can engage said rotor to stop rotation of said drum barrel, said second assembly being biased such that it lightly engages a second side of said rotor during normal operation;

means for activating said first and second caliper assemblies; and

a hydraulically actuated band brake assembly for controlling rotation of said drum barrel during normal operation and under emergency conditions, said band brake assembly including an emergency actuator for engaging said band brake.

4,696,378

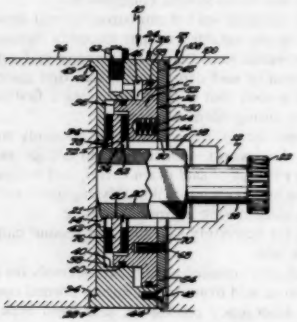
AXIALLY COMPACT BRAKE

Edward Brooks, Fridley, Minn., assignor to Houton Manufacturing Co., Inc., Minneapolis, Minn.

Filed May 23, 1985, Ser. No. 737,160
Int. Cl.[4] F16D *65/24*
U.S. Cl. 188—170 **16 Claims**

1. Brake for rotationally controlling a shaft of an electric motor for driving a machine, robot, or other apparatus component, with the machine, robot or other apparatus component including a base plate, with the base plate including a recess having a diameter, with the electric motor having a casing including an annular lip, with the electric motor having mounting flanges including axially extending mounting apertures, comprising, in combination: an air-chamber housing portion having a generally square outer perimeter including corners, with the air-chamber housing portion including a radially oriented, annular disc and a generally axially extending, cylindrical member extending from a first face of the annular disc, with the generally axially extending, cylindrical member being integral with the radially oriented, annular disc, with the generally axially extending, cylindrical member including a first, annular portion having a first, interior cylindrical surface and including a second, annular portion having a second, interior cylindrical surface and a radial, annular surface having an

outer diameter, with the first, annular portion being integral with the second, annular portion; mounting pads formed in the corners of the outer perimeter beyond the second, annular portion of the air-chamber housing portion, with the mounting pads including axially extending bores; an annular piston, with the piston including an annular portion having a radially extending interface surface, an axially extending annular flange extending from the radially extending interface surface of the annular portion, with the axially extending annular flange having an outer diameter defining a first surface of the piston, and a radially extending annular flange extending from the annular portion radially outward of the axially extending annular flange from the radially extending interface surface, with the radially extending annular flange having an outer diameter defining a second surface of the piston, with the first surface of the piston having a diameter complementary to and for slidable receipt within the first, interior cylindrical surface of the air-chamber housing portion and the second surface of the piston having a diameter complementary to and for slidable receipt within the second, interior cylindrical surface of the air-chamber housing portion, with a fluid pressure cylinder being formed and defined by the axially extending cylindrical member of the air-chamber housing portion and the piston for the receipt of fluid pressure therein for moving the piston in a first axial direction away from the radially oriented, annular disc of the air-chamber housing portion; a generally flat, annular plate having an axially extending aperture, a thickness, and an outer



diameter equal to the outer diameter of the radial, annular surface of the air-chamber housing portion and the diameter of the recess of the machine, robot, or other apparatus component, with the annular plate abutting with and secured to the radial, annular surface of the second, annular portion of the air-chamber housing portion, with the mounting pads extending axially beyond the radial, annular surface of the second, annular portion of the air-chamber housing portion generally one half the thickness of the annular plate, with the mounting pads including a recess having an interior cylindrical surface having a diameter equal to the outer diameter of the radial, annular surface of the air-chamber housing portion for receiving the annular plate; torque pins extending between the annular plate and the piston for preventing the piston from rotating relative to the annular plate and to the air-chamber housing portion; axially extending coil springs extending between the annular plate and the piston for biasing the piston in the opposite axial direction towards the radially oriented, annular disc of the air-chamber housing portion; bolts extending through the mounting apertures of the mounting flanges of the motor and through the axially extending bores of the mounting pads of the air-chamber housing portion and threadably secured into the base plate of the machine, robot, or other apparatus component for mounting the electric motor to the base plate of the machine, robot, or other apparatus component with the air-chamber housing being sandwiched between and supported by the electric motor and the base plate; an input hub attached to and supported by the shaft of the electric motor and independent of the air-chamber housing portion, with the input hub including means for driving the machine, robot or other apparatus component, with the air-chamber housing portion being independent of the input hub, with the input hub being rotatable within the air-chamber housing portion; an interface member slidably mounted but rotatable with the input hub, with the interface member being capturable between the radially oriented, annular disc of the air-chamber housing portion and the radially extending interface surface of the piston for interfacing between the first face of the radially oriented, annular disc of the air-chamber housing portion and the input hub; a lip located on the radially oriented, annular disc opposite to its first face forming a pilot rabbet motor mount for receipt on the annular lip of the casing of the electric motor for insuring that the air-chamber housing portion is centrally and concentrically located with respect to the motor casing and to prevent radial movement between the air-chamber housing portion and the electric motor casing, with the independence of the input hub and the air-chamber housing portion from each other permitting the brake to be axially compact allowing the machine, robot or other apparatus component to be located closely adjacent to the electric motor and preventing a significant increase in the stress load placed upon the shaft of the electric motor due to its support of the input hub.

4,696,379

HYDRAULIC BUFFER

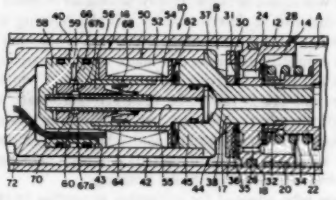
Toshiaki Yamamoto, Toyota; Hiroyoshi Kako, Aichi; Takuo Shibata, Okazaki; Takashi Izuo, Toyota; Hajime Kamimae, Toyota, and Hiroaki Takegawa, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 772,931, Sep. 5, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,240

Claims priority, application Japan, Oct. 8, 1984, 59-151164

Int. Cl.[4] F16F *9/34, 9/46*

U.S. Cl. 188—299 **6 Claims**



1. A hydraulic buffer comprising:

a cylinder containing liquid;

a piston disposed movably in the cylinder to partition the interior of said cylinder into two liquid chambers;

a piston rod connected to the piston and having a first path communicating with one of said liquid chambers and extending axially beyond said piston and a second path communicating with the other of said liquid chambers;

a solenoid valve provided with a tubular spool disposed in said piston rod for movement axially with respect to the piston rod and having a third path extending radially and located for communicating with the second path in said piston rod in at least one axial position of said spool; and

a pipe disposed inside and extending all the way through said spool, the pipe having a first end sealingly communicating with the first path in said piston rod, having a second closed end, and having a fourth path extending radially intermediate said first and second ends in substantial radial alignment with said second path and located for communicating with the third path in said spool at least when the spool is in said one axial position, such that the pipe substantially isolates the ends of the spool from liquid flowing

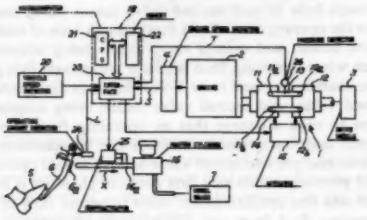
between the fist and second paths, thereby eliminating the influence, on the axial position of the spool, of the pressure gradient due to flow of said liquid between said first and second paths.

4,696,380

DECELERATION CONTROL SYSTEM FOR AUTOMOBILES

Yasuo Kita, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed Oct. 28, 1985, Ser. No. 792,299
Claims priority, application Japan, Oct. 31, 1984, 59-230928
Int. Cl.[4] B60K *41/26*
U.S. Cl. 192—4 A **13 Claims**



1. A deceleration control system for an automobile provided with an engine, drive wheels, a braking system including a brake pedal and wheel brakes, and a continuously variable transmission interposed between said engine and said drive wheels, a reduction ratio of said transmission being continuously variable in accordance with an operating signal applied to an actuating terminal for controlling said reduction ratio, and

said deceleration control system comprising:

an engine speed detector means for detecting a rotational speed of said engine;

means for detecting brake pedal movement during actuation thereof;

an engine brake controller means for producing an operating signal corresponding to said brake pedal movement by a driver and for applying said operating signal to said actuating terminal thereby to change said reduction ratio so as to provide engine braking commensurate with said ratio change;

a wheel brake controller means for augmenting said engine braking by operating said wheel brakes, only when the engine speed detected by said engine speed detector reaches a predetermined level, so that said engine speed will not exceed said predetermined level.

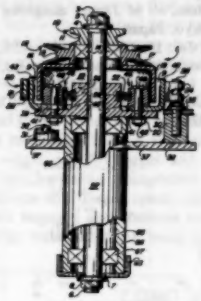
4,696,381

CLUTCH AND BRAKE APPARATUS

Lee A. Johnson, Sr., P.O. Box 717, Ridgeland, Miss. 39157

Filed Sep. 27, 1985, Ser. No. 780,834
Int. Cl.[4] F16D *67/02*; A01D *69/08*
U.S. Cl. 192—17 R **14 Claims**

1. A clutch and brake apparatus for a power-driven implement comprising a shaft; at least one drive pulley rotatable on said shaft, said drive pulley cooperating in driving relationship with the power source in the power-driven implement; a pulley drum fixedly attached to said drive pulley; a hub assembly keyed to said shaft and a hub plate provided on said hub assembly; a pair of arcuate drum segments pivotally mounted on said hub plate in a plane which is substantially perpendicular to the axis of said shaft; a pair of curved brake shoes fixedly carried by said drum segments, respectively, said brake shoes located inwardly of said pulley drum; and a pair of coil springs provided in cooperation with said brake shoes for normally biasing said brake shoes into contact with said pulley drum; and a brake band normally disposed in close proximity to said drum segments, said brake band operable to selectively engage said drum segments and disengage said brake shoes from said pulley



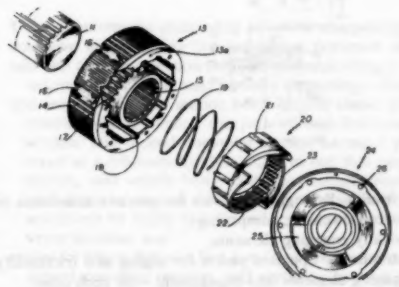
drum and stop rotation of said shaft, without interrupting rotation of said drive pulley and said pulley drum on said shaft and operation of the power source.

4,696,382

FRONT WHEEL HUB CLUTCH

Richard Aho, 5551 NE. 33rd Ave., Fort Lauderdale, Fla. 33308

Filed Jul. 14, 1986, Ser. No. 885,582
Int. Cl.[4] F16D *1/06, 11/00*
U.S. Cl. 192—67 R **1 Claim**



1. A clutch to permit engagement and disengagement of a splined axle **11** with a power drive means **13** which has an inner axle hub **15**, internally splined to engage with said axle and externally splined, and a body **14** with internal ridges and grooves **18** and external grooves and ridges connectable to a power source, comprising:

(a) a clutch ring **20** having exterior ridges and grooves **21**, interior ridges and grooves **22** and a plurality of rearwardly extending ramps **23**; wherein said exterior ridges and grooves **21** are engaged with said body internal ridges and grooves **18**;

(b) a movable control body **24** having a plurality of forwardly extending leaf springs **25** registerable with said ramps; and

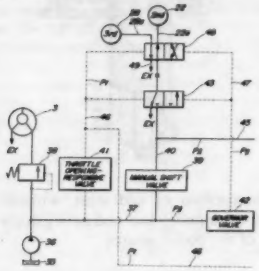
(c) a spring **19** forward of said clutch ring; whereby rotation of said body **24** causes said clutch ring **20** to move forward so that its interior ridges and grooves **22** engage the inner axle hub **15** while reverse rotation causes the clutch ring **20** to move rearward so as to disengage.

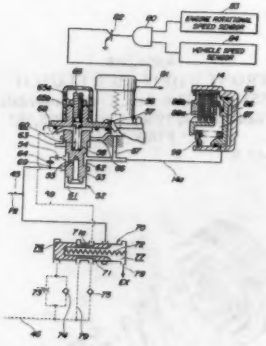
4,696,383

HYDRAULIC CLUTCH FOR MOTOR VEHICLES, HAVING CREEP-INHIBITING FEATURE

Takashi Aoki, Fujimi; Yukihiro Fukuda, Asaka, and Masao Nishikawa, Nerima, all of Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jul. 15, 1985, Ser. No. 755,068
Claims priority, application Japan, Jul. 13, 1984, 59-106224[U]
Int. Cl.[4] F16D *13/72, 25/061, 25/14*
U.S. Cl. 192—70.12 **2 Claims**





1. A frictionally engaging device for power transmission of an automotive vehicle, comprising:

frictionally engaging elements;

a hydraulically operated piston for urging said frictionally engaging elements into engagement with each other;

a first pressure chamber defined in part by said piston at one side of said piston;

a second pressure chamber defined in part by said piston at another side thereof and accommodating said frictionally engaging elements;

an operating fluid pressure source for supplying said first pressure chamber with an operating fluid pressure acting upon said piston to bias same in a direction of engaging said frictionally engaging elements with each other;

spring means acting upon said piston to bias same in a direction of disengaging said frictionally engaging elements from each other;

hydraulic pressure control means interposed between said operating fluid pressure source and said first pressure chamber, for controlling said operating fluid pressure supplied from said operating fluid pressure source at least to a value higher than a first predetermined value which causes engagement of said frictionally engaging elements and to a second predetermined value slightly lower than said first predetermined value, which causes disengagement of said frictionally engaging elements to inhibit creeping of said frictionally engaging elements;

first valve means having a first through hole formed in said piston for allowing escape of operating fluid from said second pressure chamber to said first pressure chamber, and a valve body adapted to open and close said first through hole, said first valve means being adapted to open when said operating fluid pressure within said first pressure chamber is lower than said second predetermined value to allow escape of said operating fluid from said second pressure chamber to said first pressure chamber; and

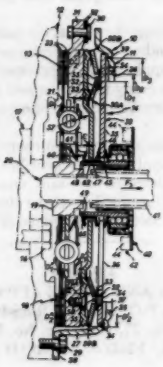
second valve means having a second through hole formed in said piston, and a valve body arranged on a side surface of said piston at said one side thereof to open and close said second through hole, the opening area of said second through hole of said second valve means being smaller than the opening area of said first through hole of said first valve means, said second valve means being adapted to open when operating fluid pressure within said first pressure chamber is equal to or lower than said first predetermined value, said second valve means being adapted to open to such a degree that an operating fluid pressure within said first pressure chamber can be maintained at said second predetermined value so long as said operating fluid pressure within said first pressure chamber is lower than said first predetermined value to permit flow of said operating fluid from said first pressure chamber to said second pressure chamber, so that said frictionally engaging elements are cooled by said flowing operating fluid.

4,696,384

CLUTCH COVER ASSEMBLY AND CLUTCH INCORPORATING SAME

Alain Huber, Paris, France, assignor to Valeo, Paris, France

Filed Oct. 24, 1986, Ser. No. 923,040
Claims priority, application France, Oct. 28, 1985, 85 15964
Int. Cl.[4] F16D *13/44*
U.S. Cl. 192—70.27 **16 Claims**



1. Clutch cover assembly comprising a substantially annular cover adapted to enable said assembly to be attached to a reaction plate or flywheel, a substantially annular pressure plate axially movable relative to but constrained to rotate with said cover, and engagement means adapted to urge said pressure plate in the axial direction away from said cover and formed at least in part by axially acting spring means comprising at least two Belleville washers disposed radially one inside the other with the larger diameter periphery of one Belleville washer lying on a circumference of smaller diameter than a circumference on which lies the smaller diameter periphery of the other Belleville washer.

4,696,385
ELECTRONIC COIN DETECTION APPARATUS

Ronald C. Davies, South Wales, United Kingdom, assignor to Digital Products Corporation, Fort Lauderdale, Fla.

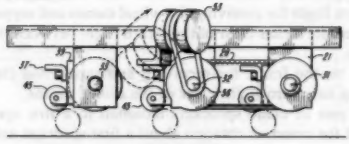
Filed Jun. 5, 1984; Ser. No. 617,334
Int. Cl.[4] G07D 5/08
U.S. Cl. 194—319 12 Claims

1. Coin detector apparatus comprising:
means for measuring the response of a coin to be tested to an oscillating electromagnetic field so as to provide an output indicative of a measured value related to the mass and conductivity of said coin;
means for exposing said coin to be tested to radiation;
means in light communication with said coin to be tested for providing a signal representative of the
average reflectivity of the coin;
means for comparing said signal to a predetermined level; and
means responsive to said measured value exceeding a selected threshold and said signal exceeding said predetermined level for providing an indication that said coin is genuine.

4,696,386
CONVEYOR SYSTEM DIVERTER TURN ASSEMBLY

Hans J. Lem, 352 Hillview Ter., Franklin Lakes, N.J. 07417

Filed Jun. 14, 1985, Ser. No. 745,257
Int. Cl.[4] B65G 47/46
U.S. Cl. 198—372 6 Claims

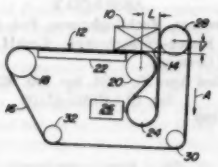


1. In a conveyor system in which articles are conveyed at a preselected nominal base height, a diverter assembly comprising:
a plurality of rotatable shafts extending transversely to the direction from which articles approach the diverter assembly;
means for rotating at least one of said plurality of rotatable shafts;
coupling means for causing said shafts to rotate together;
a respective rocker frame journaled for pivotal motion around each shaft, each frame carrying a plurality of wheels mounted on respective brackets which are individually adjustable as to angular orientation with respect to said shaft;
means for affirmatively driving each wheel from the respective shaft at an individually selectable speed ratio relative to the rotation of said respective shaft, said individually selectable speed ratio increasing across said respective shaft; and
means for rocking said frames about their respective shafts to move the wheels between a first position in which the wheels are below the nominal base height and a second position in which the wheels are above the nominal base height so as to engage and control articles being transported by said conveyor system, said means for rocking said frames maintaining said wheels in a plane substantially parallel to the plane of the nominal base height; said speed ratio increasing from a smaller speed ratio with which the wheel which engages and controls the inner portion of articles being transported by said conveyor system is driven to a larger speed ratio with which the wheel which engages and controls the outer portion of articles being transported by said conveyor system is driven.

4,696,387
WORKPIECE ROLLOVER APPARATUS

Larry D. Durchenwald, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Apr. 21, 1986, Ser. No. 854,284
Int. Cl.[4] B65G 47/24
U.S. Cl. 198—394 11 Claims



1. An apparatus for positioning an article comprising:
conveyor means having first and second conveyor sections said first conveyor section being advanceable along a predetermined path and at least partially supporting said article;
said second conveyor section being located above and perpendicularly traversing the path of said first conveyor section, said second conveyor section having a path of travel at a substantially right angle to said first conveyor section, said article being conveyed simultaneously by said first and second conveyor sections, whereby said article can be rolled to a desired orientation by said conveyor sections; and
means for advancing said first conveyor section toward said second conveyor section, said second conveyor section away from said first conveyor section, and simultaneously stopping and holding said article motionless.

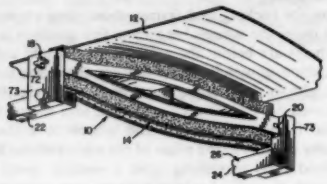
4,696,388
CONVEYOR BELT SCRAPER BLADE ASSEMBLY WITH CONTOURED SURFACE

Donald L. Stoll, Huntington, W. Va., assignor to Richwood Industries, Inc., Huntington, W. Va.

Filed Dec. 3, 1985, Ser. No. 804,215
Int. Cl.[4] B65G 45/00
U.S. Cl. 198—493 10 Claims

1. A scraper blade assembly for a conveyor belt comprising:
an elongate blade body made of a resilient material and having a longitudinally-extending, continuous belt scraping surface and a central longitudinal axis;
frame means attached to said body for imparting a convex shape to said belt scraping surface such that said surface is at a greater distance from said axis at a mid-portion of said body than at ends thereof; and
means for attaching said blade assembly to support structure

such that said elongate blade body extends transversely of an associated conveyor belt, whereby substantially an



entire width of said belt is contacted by said scraping surface.

4,696,389

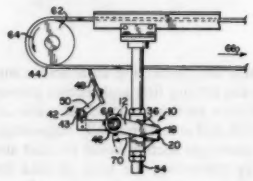
MOUNTING FOR A CONVEYER BELT SCRAPER ASSEMBLY

Hans-Otto Schwarze, Recklinghausen, Fed. Rep. of Germany, assignor to Hosch-Fordertechnik GmbH, Recklinghausen, Fed. Rep. of Germany

Filed Apr. 30, 1984, Ser. No. 605,414

Int. Cl.[4] B65G *45/00*

U.S. Cl. 198—499 **8 Claims**



1. A mounting for a belt scraper assembly including displacement means adapted to permit arcuate displacement of the assembly when the belt executes a reverse movement, said displacement means comprising a lever arm having at its one end a formation in which a mounting shaft supporting a blade assembly is secured, said blade assembly including a first pivotal mounting permitting said blade assembly to be pivotally mounted to said mounting shaft, said first pivotal mounting including a first torque storage means permitting the blade assembly to execute an arcuate movement about the first pivotal mounting; said lever arm being pivotally mounted at its other end to a support shaft via a second pivotal mounting, said second pivotal mounting including a second torque storage means permitting the lever arm to execute an arcuate movement about the second pivotal mounting; said second torque storage means adapted to apply pressure to the belt assembly to track the belt and resist arcuate displacement of the belt assembly, said second torque storage means comprising a shaft of angular cross-section mounted within an angular sleeve with plural pads of elastic material interposed between the shaft and the sleeve, the torque stored in the second torque storage means having a predetermined value of a sufficient magnitude to ensure that the blade assembly is only arcuately displaced when the belt reverses its direction; said mounting further including an adjustable stop for adjusting and limiting the arcuate travel of the lever arm in the direction toward the belt.

4,696,390

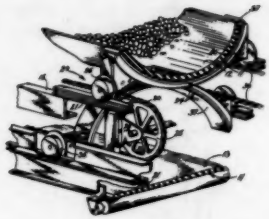
BULK CONVEYOR

Marland Curtis, E. 5825 Railroad, Spokane, Wash. 99212

Filed Jan. 27, 1986, Ser. No. 822,859

Int. Cl.[4] B65G *15/08*

U.S. Cl. 198—823 **13 Claims**



1. A bulk conveyor, comprising:

an elongated endless belt;

an elongated frame having opposed ends;

end rolls on the elongated frame for mounting the endless belt to form an elongated working flight and a return flight;

drive means for moving the belt through the working flight and return flight;

a plurality of cradle means, each having an elongated belt receiving surface extending between cradle ends for releasably receiving the belt along the working flight thereof;

wheel means on each end of each cradle means for free rotation thereon about wheel axes oriented longitudinally with respect to the elongated belt receiving surfaces;

a first set of rigid track means on the frame extending longitudinally between the end rolls and adjacent the working flight for receiving the wheel means and supporting the cradle means and belt along the working flight between the end rolls;

a second set of rigid track means on the frame extending longitudinally between the end rolls and adjacent the return flight for receiving the wheel means and supporting the cradle means clear of the return flight between the end rolls;

means on the frame for receiving and supporting the belt along its return flight clear of the cradle means;

a first pair of chain sprockets mounted to a first sprocket shaft for common rotation about a first sprocket axis that is transverse to the endless belt and positioned between the first and second sets of tracks;

a second pair of chain sprockets mounted to a second sprocket shaft for common rotation about a second sprocket axis transverse to the endless belt and positioned between the first and second sets of tracks with each sprocket of said second pair aligned with a sprocket of the first pair;

a pair of endless roller chains extending between and engaged around aligned sprockets of the first and second sprocket pair; and

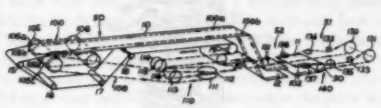
means on each cradle means, separate and spaced from the wheel means and wheel axis for connecting each cradle means to the roller chains at points along the lengths of said roller chains such that the belt receiving surfaces of said cradle means are held transverse to the endless belt and stationary relative to the associated connection points along the chains.

4,696,391

CONVEYING APPARATUS

Gerald R. O. Pentith, Ashby de la Zouch, United Kingdom, assignor to Fletcher Sutcliffe Wild Ltd., United Kingdom

Filed Aug. 8, 1986, Ser. No. 897,659
Claims priority, application United Kingdom, Aug. 20, 1985, 8520817; Nov. 7, 1985, 8527522
Int. Cl.[4] B65G *23/14*
U.S. Cl. 198—833 10 Claims



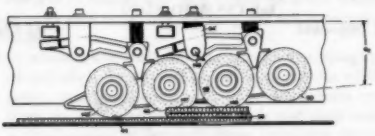
1. Conveying apparatus comprising a continuous looped belt supported on cable portions in turn supported on pulley arrangements, the cable portions being driven by drive means to form upper and lower runs which support upper and lower runs of the belt, the cable portions forming part of a single cable and reversing pulleys and cross-over pulleys being provided for guiding the cable from each of the pulley arrangements to the other pulley arrangement, characterised in that the belt has formations within its width which seat on the cable portions, means are provided for divergently guiding the cables at specific locations to allow the belt to pass between the cable portions, and the pulley arrangements for the two cable portions are parallel, so that the lengths of cable in one cable portion are equal to corresponding lengths of cable in the other cable portion between the drive means and return pulleys, between the return pulleys and the reversing pulleys, between the reversing pulleys and the cross-over pulleys and between the cross-over pulleys and the drive means.

4,696,392

CAGE ROLL ASSEMBLY

Donald P. Chisholm, Jr., Merrimac, N.H., assignor to Specialty Equipment Corporation, Worcester, Mass.

Filed May 16, 1986, Ser. No. 864,040
Int. Cl.[4] B65G *39/18*
U.S. Cl. 198—836 14 Claims



1. In a conveyor having a belt adapted to move in a predetermined direction, an anti-toggling continuous contact cage roll asembly for use in the transportation of corrugated blanks along said moving belt comprising:

a modified four-bar linkage system extending fore and aft relative to the direction of movement of said belt, said linkage system including two linkage arms, a frame, and a bar linked to said frame by said linkage arms, with one end of each arm pivotally mounted to respective fore and aft ends of said bar and with the other end of each arm pivotally mounted to said frame respectively in fore and aft frame mounts, with one frame mount having compliant means to permit the associated arm pivot to move, thereby to permit canting of said bar with respect to said frame;

a number of rollers mounted for rotation to said bar; and,

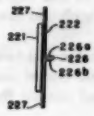
means for urging said bar away from said frame.

4,696,393

APPLICATOR WIPE FOR INVISCID FLUIDS

Thomas C. Laipply, 13530 Fox Den East, Russell, Ohio 44072

PCT No. PCT/US85/00120, § 371 Date Sep. 23, 1985, § 102(e) Date Sep. 23, 1985, PCT Pub. No. WO85/03275, PCT Pub. Date Aug. 1, 1985
Continuation-in-part of Ser. No. 312,879, Oct. 19, 1981, Pat. No. 4,427,115, and a continuation-in-part of Ser. No. 312,880, Oct. 19, 1981, Pat. No. 4,427,111. This PCT application Jan. 23, 1984, Ser. No. 781,236
The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.
Int. Cl.[4] B65D *83/00, 75/00*
U.S. Cl. 206—210 15 Claims



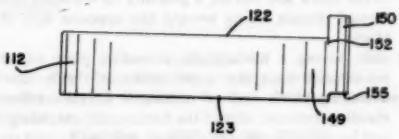
1. A combined fluid storage container and applicator device for relatively inviscid fluids, said device comprising a sheet-like fluid impermeable material having generally symmetrical halves positioned in generally flat parallel overlying relation to each other, a pair of respective edges of said material halves being securely joined along an effective fold line as an effectively single integral sheet of said material halves, temporary seal means sealing said halves to each other along a temporary seal line beginning and ending at said fold line forming a cavity and enclosing fluid between said halves and within said temporary seal line and said fold line, a fluid in said cavity, and separation means for simultaneously applying separating force substantially symmetrically to both said halves of said sheet and to said temporary seal means without tearing said sheet, said separation means including means for applying simultaneously in at least two opposing directions continuous separating force out of the plane and at an angle that is no greater than about a perpendicular to the generally planar extent of the device to open said temporary seal means along at least a portion of the length of said seal line to form a flat surface covered with the fluid while the integrity of said sheet is maintained.

4,696,394

EASILY REMOVABLE PROTECTIVE COVERING FOR ANNULAR OBJECTS

Michael H. Estkowski; Robert S. Doumani, both of St. Joseph, and Christopher G. Estkowski, Coloma, all of Mich., assignors to Shepherd Products U.S., Inc., St. Joseph, Mich.

Continuation-in-part of Ser. No. 800,754, Nov. 22, 1985, abandoned. This application Nov. 5, 1986, Ser. No. 927,534
Int. Cl.[4] B65D *37/00, 85/02*
U.S. Cl. 206—303 2 Claims



1. A protective covering for a caster wheel tread comprising a continuous band of heat-shrinkable polyvinyl chloride defining spaced marginal side edges thereabout,

said band being proportioned to be closely received over

and about the wheel tread in overlapping relation to the wheel along both side edges of the wheel tread for heat shrinking thereagainst and thereabout, whereby said band including said side edges thereof will be tensioned against the wheel tread and the wheel tread side edges respectively, when the wheel is centered within said protective covering and said protective covering is heat shrunk against such wheel tread,

said band including release means formed perpendicular to its periphery for effecting finger gripping of one side edge thereof and pulling free of said band between said side edges thereof for severing said band whereby the severed band under said tension springs away from the wheel tread when such section is formed,

said release means including an upstanding finger grip tab extending from one of said edges thereof,

said tab being integral with said band and extending laterally of said band, and

a pair of tear slits formed in said band, one disposed on either side of said tab at said one of said edges of said band,

said slits being directed toward the other of said edges of said band, and

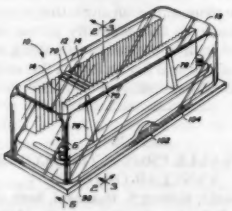
a tear notch formed in said band at said other of said edges of said band, said notch being aligned with said tab.

4,696,395

SUBSTRATE CONTAINER

Mark S. Rivoli, Torrance, Calif., assignor to Northrop Corporation, Hawthorne, Calif.

Filed Nov. 14, 1986, Ser. No. 930,849
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—334 **21 Claims**



1. A container for retaining, supporting and transporting a plurality of hybrid substrates in a vertical orientation comprising:

a base having a fixed, horizontally extending block with a fixed lateral support vertically upstanding from one face of the block and having a plurality of v-shaped notches formed therein facing toward the opposite face of the block;

a slide having a horizontally extending plate adjustably positionable upon the upper surface of the horizontally extending block with an adjustable lateral retainer upstanding from one edge of the horizontally extending plate and having a plurality of v-shaped notches formed therein facing the v-shaped notches of the fixed lateral support;

attachment means to releasably secure the slide to the base in any one of a plurality of positions; and

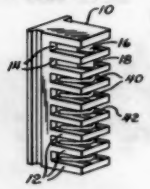
a cover positionable over the base and slide to protect the hybrid substrates supported by the block and slide.

4,696,396

HEMOSTATIC CLIP CARTRIDGE

Peter B. Samuels, 14708 Sutton St., Sherman Oaks, Calif. 91403

Continuation of Ser. No. 810,581, Dec. 19, 1985, abandoned.
This application Mar. 9, 1987, Ser. No. 22,576
Int. Cl.[4] B65D *85/16*
U.S. Cl. 206—339 **5 Claims**



1. A cartridge for storing and singly dispensing hemostatic clips which are preformed into the proper shape for engagement by a clip applicator,

said cartridge having a body portion with a plurality of parallel walls each face thereof defining one side of a clip compartment,

means for retaining a clip in each of said clip compartments for permitting dispensing of said clip upon insertion of said clip applicator,

said clip compartments being dimensioned to permit reception of said applicator without deformation of said parallel walls,

said means for retaining and dispensing the clips comprising a pair of outwardly projecting, opposed channel members extending from each face of each parallel wall into said clip compartments, said opposed channel members positioned and dimensioned so that a clip is releasably compressed therebetween,

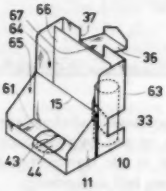
whereby removal of a clip from one compartment by insertion of the applicator does not release or compress clips in adjacent compartments.

4,696,397

CONTAINER FOR FLOPPY DISKS AND THE LIKE

Yoshiro Nakamats, 1-10-1105, Minami Apyama 5-chome, Minato-ku, Tokyo, Japan

Filed May 7, 1985, Ser. No. 731,429
Claims priority, application Japan, May 7, 1984, 59-89223
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—444 **12 Claims**



1. A container for articles such as floppy disks and the like comprising a body and a lid, pivotal means pivotably connecting said lid to said body, said body having a bottom wall and a front wall connected to said bottom wall, said lid having a top wall and a front wall connected to said top wall, the container having a closed position in which said top wall overlies said bottom wall and the front wall of said lid forms a generally coplanar continuation of the front wall of said body, the container having an open position in which the lid is pivoted from said closed position 180° about said pivotal means to locate the front wall of said lid side-by-side and parallel to the front wall

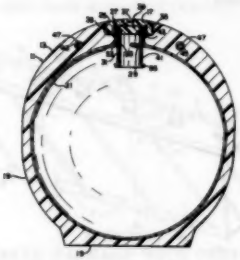
of the body such that both the body and the lid open upwardly to receive said articles in the body and in the lid, and latch flap means on said body and said lid which are interengaged when said lid is in its open position to latch said body and lid together in said open position, whereby the body and lid are latched to one another by said latch flap means while both the body and lid are open at the top to receive articles therein, said latch flap means comprising a latch flap section formed on said front wall of said body and defined by a latch flap cut line and a latch flap fold line such that the latch flap section can be pivoted along said latch flap fold line between a non-latching position in which the latch flap section is coplanar with said front wall of said body and a latching position in which the latch flap section extends generally perpendicularly to said front wall of said body, said latch flap means further comprising a cut line in said lid for receiving said latch flap section when the latter is in said latching position to thereby latch said lid to said body.

4,696,398

FREE DROP LIQUID CONTAINER WITH EXTENDABLE SPOUT

Floyd Steinmetz, Jr., c/o Steinmetz & Sons Machinery Co., P.O. Box 393, Moscow, Pa. 18444

Filed Oct. 17, 1984, Ser. No. 661,959
Int. Cl.[4] B65D *85/72*
U.S. Cl. 206—521 **29 Claims**



1. A free drop container for liquids adapted to be dropped from aircraft, comprising

a molded, impact resistant, strong and substantially rigid outer shell having a generally spherical shape and being made of a plastic material that is resilient and adapted to deform on impact and then spring back into shape,

said outer shell being free-standing and self-supporting when empty,

port means in said shell defining a port hole through the wall of said shell for passing liquids into and out of the container, said hole having a first diameter portion extending from the exterior partially through said shell wall and a second smaller diameter portion extending through the rest of the shell wall to the interior thereof, said first and second diameters portions defining a seat in said shell wall;

said container having a substantially smooth outer surface with no protuberances that might break on impact or might break the container on impact when the container is dropped to the ground from an aircraft;

a cap removably fitted to close said first diameter portion of said hole and forming a substantially smooth shape with the outer surface of the rest of the container so as to provide a substantially smooth outer surface with no protuberances;

an integral retractable pour spout sized to slidably fit said second diameter portion and positioned to extend out from said shell when said cap is removed and it is desired to pour the liquid from the container, and is retracted and positioned inside the container when being stored or transported so as to not protrude from the container;

plug means removably fitted in said pour spout to seal the interior of said inner shell; and

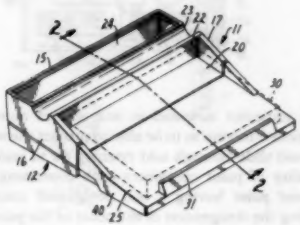
a liner covering the interior of said shell made of elastic material that is adapted to expand and contract and is approved for containing water for contact with potable liquids inside said shell.

4,696,399

NOTEPAPER DISPENSING TRAY

David C. Windorski, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 634,972, Jul. 27, 1984, abandoned. This application Oct. 29, 1985, Ser. No. 793,481
Int. Cl.[4] B65D *6/04*
U.S. Cl. 206—565 **4 Claims**



1. A dispenser for a stack of sheet material comprising sheets joined in the stack by a narrow band of pressure-sensitive adhesive on one side of each sheet adjacent one end and affording dispensing of single sheets from the stack and separation of the adhesive coated end of the single sheet from the remaining sheets in the stack, said dispenser comprising:

a support member having a generally planar support surface for supporting the stack of sheet material,

clamping means cooperating with said support surface for engaging the lowermost sheet of said stack between said adhesive coated end and the other end opposite aid coated end, and fixing said sheet in relationship to the support, and

abutment means projecting above the plane of the support surface for engaging said other end of said stack for cooperating with said clamping means for restricting movement of said stack in relationship to the support surface during separation of the top sheet from a said stack, wherein

said clamping means cooperating with said support surface comprises a clamping plate adapted to be positioned over a lowermost sheet in a said stack and said clamping plate is formed with a clamp member comprising a flange connected to the forward edge of the clamping plate and extending transversely of the support member and a second plate member positioned beneath the support member which is normally spaced from the clamping plate by a distance less than the thickness of the support member to urge the clamping plate toward the support surface to frictionally fix said lowermost sheet onto said support surface.

4,696,400

KIT FOR CREATING WALL MURALS

Leigh Warman, 81 Penshurst Gardens, Edgware, Middlesex, England

Filed Oct. 2, 1985, Ser. No. 783,000
Int. Cl.[4] B65D *71/00*; G03B *29/00*
U.S. Cl. 206—575 **5 Claims**

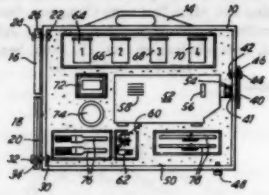
1. A kit for producing a wall mural on one of a pair of opposing walls in a room, the apparatus comprising:

a housing defining an opening and a plurality of recesses;

an upper bracket pivotally secured to said housing for securing an upper part of the housing to the other of said pair of walls;

a pair of lower brackets pivotally secured to the housing for securing the lower part of the housing to the said other of said pair of walls;

at least one slide carrying an image to be reproduced on said one wall, the image comprising boundary lines designating areas of different color and a designation in each area corresponding to a designated color for that area;



a slide projector mounted in one of said recesses and so positioned therein as to be able to project the said image of the said slide through said opening on to said one wall;

a plurality of paint containers each containing a different colored paint having a said designated color and each bearing the designation of the color of the paint contained therein;

and a plurality of brushes for painting the said one wall in accordance with the projected image.

4,696,401

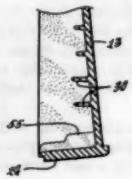
CUSHIONING PACKAGING MEDIA

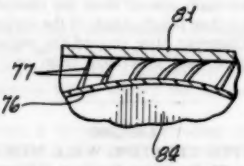
Robert S. Wallace, 823 S. Longwood, Los angeles, Calif. 90005, assignor to Robert S. Wallace, Los Angeles and Jack Bauman, Pacific Palisades, both of, Calif., a part interest

Continuation-in-part of Ser. No. 744254, Jun. 13, 1985, Pat. No. 4,592,468. This application Jun. 2, 1986, Ser. No. 869,670

Int. Cl.[4] B65D *81/10, 81/16*

U.S. Cl. 206—594 **13 Claims**





1. For use in packaging a structure, the combination with and including said structure comprising:

(a) a container and an associated interior support wall, said structure located within the container, and

(b) solid fins integral and one piece with said wall and projecting generally toward said structure at different sides thereof and to confine same during said packaging,

(c) said fins being resiliently and yieldably deflectable to bend relative to said support wall in response to squeezing relatively toward said structure, said support wall and fins consisting of readily cuttable plastic material,

(d) said fins extending in generally the same direction along said wall and having terminal edges that define a positioning plane relative to which said fins are out of perpendicularity,

(e) the fins extending in substantially parallel relation and at an angle α relative to the plane defined by the wall, the fins tapering outwardly away from that wall and toward fin terminals, said angle α being between about 70° and 88°,

(f) the fins squeezed between said structure and the support wall so that the fins are resiliently bent and to varying extents, the support wall being flexible.

4,696,402

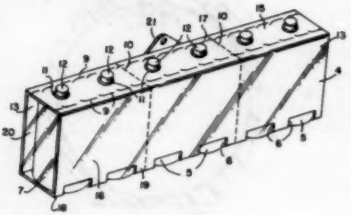
EASY-OPEN, INDIVIDUAL UNIT DISPENSING PACKAGE

Charles H. Harmon, Deforest; Thomas F. Ward, Madison, and Robert W. Zimmermann, Sun Prairie, all of Wis., assignors to Rayovac Corporation, Madison, Wis.

Filed Mar. 19, 1985, Ser. No. 713,554

Int. Cl.[4] B65D *5/54*

U.S. Cl. 206—602 **10 Claims**



1. An easily opened container capable of dispensing, one at a time, each of a plurality of individual product units placed therein, while securely holding each undispensed unit in place, which container comprises at least one perforated tear strip formed by two substantially parallel lines of perforations in close proximity to one another, the strip having at least two openings therein, each of which is capable of enclosing and securely binding a portion of an individual product unit, wherein the container further comprises means for preventing an individual product unit bound within one of said openings from engaging in motion sufficient to dislodge itself from an opening, wherein said means does not prevent easy removal of an individual product unit which is not bound by an opening.

4,696,403

BOTTLE BAG

Gregory A. Hoover, Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.

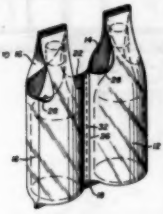
Filed Sep. 16, 1986, Ser. No. 906,456

Int. Cl.[4] B65D *30/22*

U.S. Cl. 206—602 **3 Claims**

1. In a plastic "T-shirt" bag comprising generally coextensive overlying flexible front and rear panels, and a closed bottom, said panels defining front and rear overlying side edge-joined walls projecting upwardly from said bottom, an open upward directed bag mouth defined by said walls, said panels further defining a pair of handles integral with said front and rear walls and projecting upwardly from said bag mouth, said handles being laterally spaced from each other with the

bag mouth therebetween; the improvement comprising said front and rear walls engaging each other along a linear vertical portion extending between said bottom and said bag mouth intermediate said handles and defining a bottle-receiving vertical compartment with an upwardly-opening compartment mouth to each side of said vertical portion, joinder means bonding said front and rear walls in engagement with each



other along said vertical portion, each of said handles generally aligning over a different one of said compartments, and a severable line defined along said joinder means between said closed bottom and said open mouth for enabling selective severing of said compartments, each with a generally aligned handle and open mouth, from each other, said joinder means defining a side edge seam along each severed compartment.

4,696,404

HEAT SEALED PACKAGE WITH PERFORATED COMPARTMENT SEAL

Arthur P. Corella, 8166 Vanscoy Ave., North Hollywood, Calif. 91602

Filed Aug. 27, 1986, Ser. No. 900,748
Int. Cl.[4] B65D *65/30*
U.S. Cl. 206—604 **15 Claims**

1. In a peripherally sealed dispensing package that includes a compartment with opposing walls, the improvement which comprises:

an inner seal disposed within said compartment and sealingly engaging an oppositely aligned portion of said opposing walls; and

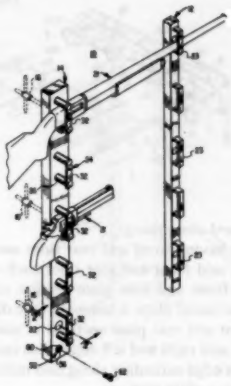
a finger traversable and gripable aperture extending through said inner seal, said aperture defining a finger pull for tearing open said sealed package to permit dispensing of the package contents.

4,696,405

GUN RACK

Patrick M. Waring, 3800 Spring Valley, #177, Dallas, Tex. 75234

Filed Jun. 13, 1986, Ser. No. 874,223
Int. Cl.[4] E05B *73/00*
U.S. Cl. 211—4 **10 Claims**



1. A gun rack comprising:

first and second channel shaped support members;

a plurality of gun barrel support brackets operatively connected to the first support member;

a plurality of locking plate means including a plurality of locking plates pivotally mounted in a spaced relationship to the second support member, said locking plates having walls forming passages in open communication with aperture walls for forming apertures positioned interiorly of the locking plates with open access passages;

a corresponding plurality of locking plate retainer pins operatively connected to the second support means, said locking plate retainer pins extending outwardly of the second support means and having adjacent to ends thereof pairs of grooves on opposing sides for passing the open passage forming walls of the locking plates and for engaging the aperture walls of the locking plates with the locking plate retainer pins;

an apertured lock member reciprocally mounted within the second support member and L-shaped connectors having first and second legs mounted to each other, said apertured lock member having a plurality of vertically spaced apertures through which the first portions of the L-shaped connectors pass and the locking plate retainer pins have apertures through which the second portions of the L-shaped connectors pass; and

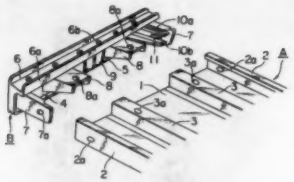
a lock means including an L-shaped lock member having first and second leg portions normal to each other, the first leg portion having an end operatively connected to the apertured lock member, a sleeve mounted in the second support member for forming a passage therethrough for the outwardly extending second leg portion, said second leg portion having a circular cross section and a plurality of spaced notches formed in the periphery thereof adjacent to the end, whereby a key having a bore with lands corresponding to the notches of the second leg portion rotates the second leg portion of the lock to raise the second leg portion of the L-shaped lock member, apertured plate, and first leg portions of the L-shaped connectors for rotating the second portions and the locking plate retainer pins to lock the locking plates to the locking plate retainer pins.

4,696,406

RACK BOARD

Masashi Karashima, 88-5, Nakano, Ebina-shi, Kanagawa-ken, Japan

Filed Sep. 5, 1985, Ser. No. 772,677
Claims priority, application Japan, Oct. 15, 1984, 59-214303
Int. Cl.[4] A47F *5/00*
U.S. Cl. 211—153 **4 Claims**



1. A rack board comprising:

a metal plate having front and rear sides and right and left edge sides, said front and rear sides each comprised of a respective front and rear plate section extending transverse to said metal plate, a fastening hole disposed on ends of said front and rear plate sections at said right and left edge sides, said right and left edge sides each consisting of a respective edge extending along said metal plate and said front and rear plate sections;

plastic side covers for covering said left and right edge sides, said plastic covers each comprised of upper and lower horizontal portions extending along said right and left edge sides and disposed in planes parallel to said metal plate, a vertical section extending between and transverse to said upper and lower horizontal portions, front and rear vertical portions extending between said upper and lower horizontal portions at the ends of said upper and lower horizontal portions and disposed in planes parallel with said front and rear plate sections, and first side bracket means attached to said vertical section and spaced from said front vertical portion and said upper horizontal portion and second side bracket means attached to said vertical section and spaced from said rear vertical portion and said upper horizontal portion, said side bracket means projecting towards said metal plate, said side bracket means each having a fastening hole for aligning with a respective said fastening hole of said front and rear plate sections for receiving a fastener to attach said side covers to said metal plate, said ends of said front and rear plate sections extending between said bracket means and said front and rear vertical portions respectively, said plate means extending between said side bracket means and said upper horizontal portion.

4,696,407

AMPHITHEATER DISPLAY

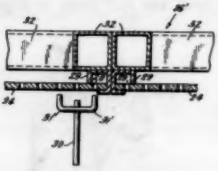
Robert P. Franklin, Lake Hopatcong, N.J., assignor to Trans-World Manufacturing Corporation, E. Rutherford, N.J.

Filed Jan. 21, 1986, Ser. No. 821,261
Int. Cl.[4] A47F *5/00*
U.S. Cl. 211—183 **11 Claims**

1. A display unit, comprising:

a rear wall having a front side and a back side, a plurality of rows and columns of openings formed in said rear wall and through which hangers for supporting items to be displayed may be inserted; and

a support frame coupled to said back side of said rear wall and providing structural support thereof, said support frame including an open channel having an open side which is aligned with and straddles at least one of said rows and/or columns of holes such that hangers may be inserted into those holes in said straddled rows and/or columns despite the presence of said support frame.

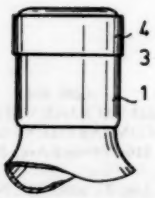


4,696,408

PLASTIC CLOSURE WITH SAFETY BAND

Werner F. Dubach, Maur, Switzerland, assignor to Alfatechnic AG, Switzerland

Filed Jul. 9, 1986, Ser. No. 883,615
Claims priority, application Switzerland, Jul. 23, 1985, 3189/85
Int. Cl.[4] B65D *41/46*
U.S. Cl. 215—237 **17 Claims**



1. A single piece plastic closure for a container comprising a base (1) and a cap connected to said base by a hinge (3), characterized in that a detachable safety band (4) is detachably engaged with said base and overlays less than about half of the perimeter of said cap and extends approximately as high as said cap, said safety band (4) arranged symmetrically and oppositely with respect to said hinge (3), whereby said closure cannot be opened without detaching said safety band from said closure.

4,696,409

VENTED FUEL TANK CAP ASSEMBLY

Robert M. Vize, Bettendorf, Iowa, assignor to Caterpillar Inc., Peoria, Ill.

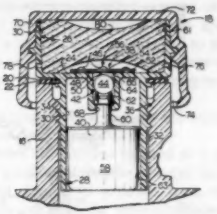
Filed Jun. 13, 1986, Ser. No. 873,882
Int. Cl.[4] B65D *51/16*
U.S. Cl. 220—203 **9 Claims**

1. A vent cap assembly for obstructing liquid egress from a tank through the cap assembly and for permitting gaseous exchange between the tank and the atmosphere, said cap assembly comprising:

a body member having first and second end portions and an interior passageway, said passageway having a stepped cross section profile and being open and unrestricted at the second end portion;

a valve seat disposed in said body member across said passageway and having an orifice therethrough, said valve seat including a flexible diaphragm having a port therein which forms a part of said orifice;

a float disposed in said passageway between said valve seat and said second end portion of said body member, said float being movable between a sealing position and a venting position; and



valve means for sealing said orifice in response to one of a condition of said float assuming said sealing position and a condition of said orifice being at a lower elevation than said float's center of mass, said valve means including;

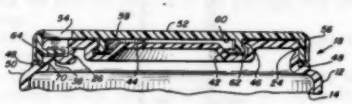
a spherical plugging member disposed in said passageway between and being engageable with said float and said valve seat, said plugging member having a projected area which is greater than the area of said port, and having a density which is about ⅓ the density of carbon steel.

4,696,410

CLOSURE WITH SIDE CUT TAMPER EVIDENT FEATURE

Walter J. Kreiseder, Barrington, Ill., assignor to Courtesy Mold & Tool Corporation, Wheeling, Ill.

Filed Mar. 26, 1987, Ser. No. 30,139
Int. Cl.⁴ B56D *51/22*
U.S. Cl. 220—267 **10 Claims**



1. A tamper evident end closure for a container comprising:

a stationary endcap portion integrally joined to and forming a closed end of said container by means of a weakened annular band and an integral well having first and second ends and a hinged portion, said well being located on said endcap portion and in said annular band;

an overcap portion attached to and covering said endcap portion and being coaxially rotatable thereabout; and

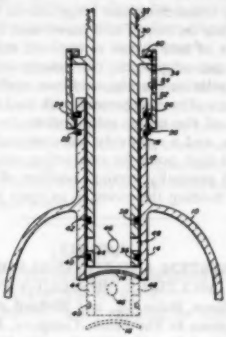
a knife blade secured to said overcap portion and arranged to engage and circumscribe said annular band as said overcap portion is rotated about said endcap portion, severing said endcap from said first end of said well to said second end of said well, forming a hinged lid for said container.

4,696,411

LARGE BREAKSEAL ACTUATOR WITH BUILT-IN VALVE

Hans-Juergen Graf, Oceanside, and Peter T. Randke, San Marcos, both of Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 20, 1986, Ser. No. 865,147
Int. Cl.⁴ B65D *43/04*
U.S. Cl. 220—281 **3 Claims**



1. A quartz or glass vessel for high purity chemicals comprising a container and means for permitting access to the contents of the container comprising:

an access tube (**12**) extending into the vessel having the internal end thereof closed by a discoid breakseal (**16**);

a removal tube (**3**) inside the access tube, the internal end closed and having formed through the walls thereof proximate the internal end thereof at least one passage (**44**, **46** or **48**);

means forming a slidable seals (**36**, **38** **40** and **42**) between the removal tube (**30**) and the internal wall of the access tube (**12**) respectively on the proximal and distal side of the passage (**44**, **46** or **48**); and

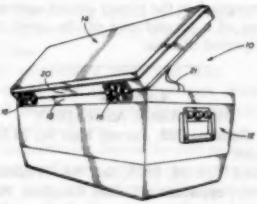
means (**34**, **52**, **18** and **20**) for moving the removal tube (**30**) axially in gas-tight sealed relationship with the access tube (**12**) to break the breakseal (**16**) and extend the proximal end of the removal tube (**30**) into the vessel (**10**) to provide fluid communication through the passage through the wall thereof **44**, **46** or **48**).

4,696,412

HINGE CONSTRUCTION FOR CONTAINER COVERS

Ronald C. McGowan, and Ninh G. Pham, both of Houston, Tex., assignors to Igloo Corporation, Chicago, Ill.

Filed Mar. 9, 1987, Ser. No. 23,549
Int. Cl.⁴ B65D *43/24*
U.S. Cl. 220—335 **20 Claims**



11. In a container having a body and a lid over the body to permit access to the body; an improved hinge mounting the lid for pivotal movement between a closed general horizontal

position over the container and an open generally vertical position; said improved hinge comprising:

a pair of interfitting leaves each having a base defining a rear face and an opposed front face;

a boss extending outwardly from the front face of each of said leaves and having a longitudinally extending opening therethrough, the bosses on the interfitting leaves being in axial alignment with each other and having axially aligned longitudinally extending openings therein;

a hinge pin received in said axially aligned openings for pivotally connecting said hinge leaves to each other; and

a cam surface on one of said leaves and a latch member on the other of said leaves in opposed relation to said cam surface and adapted to ride along said cam surface in contact relation thereto, said cam surface having a high point thereof in engagement with said latch member at a position of the cover intermediate its open and closed positions, and a relatively flat cam surface portion adjacent said high point for contacting said latch member in the open generally vertical position of the cover for releasably holding the cover in an open position.

4,696,413

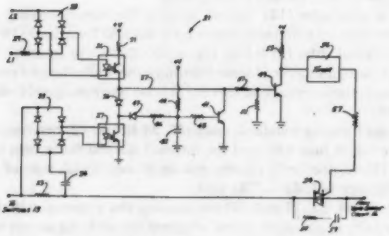
VENDING SYSTEM AND METHOD FOR PREVENTING MULTIPLE PRODUCT VENDS

Aaron W. Wilson, Boise, Id., and Richard A. Pollock, Fresno, Calif., assignors to The Vendo Company, Fresno, Calif.

Filed Jan. 15, 1986, Ser. No. 819,223

Int. Cl.[4] G07F *11/00*

U.S. Cl. 221—13 **17 Claims**



1. In a vending machine: a plurality of product delivery channels each having an electrically energized vend motor for delivering a product during a vend operation, product selection switches connected electrically in series in a power circuit and to the vend motors in respective ones of the product delivery channels for selectively energizing the motors with power from the power circuit to initiate a vend operation, means active upon the initial energization of one of the vend motors for maintaining the motor in an energized condition to complete the vend operation, means for monitoring the current in the power circuit to detect an interruption in the current due to actuation of one of the product selection switches once a first one of the vend motors has been energized, and means responsive to the interruption in the power circuit current for inhibiting energization of a second one of the vend motors for a predetermined period of time.

4,696,414

DISCHARGE ASSEMBLY

Mok K. Huat, Building 205, Jurong East St. 21,03,139, Singapore, Singapore

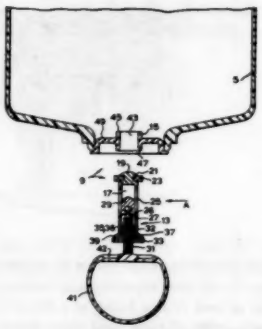
Filed Nov. 18, 1985, Ser. No. 799,004

Claims priority, application United Kingdom, Nov. 21, 1984, 8429360

Int. Cl.[4] B67D *5/08*

U.S. Cl. 222—67 **12 Claims**

1. A dispensing valve for a container comprising: a valve seat having means defining a first opening therein, a chamber having means defining a second opening therein, the chamber being movable relative to the valve seat between a filling position in which the chamber is fillable with liquid from the container through the second opening and a discharge position in which liquid in the chamber may be discharged through the second opening: first and second sealing surfaces between which the chamber is disposed, said surfaces sealing the first opening in said filling and discharge position respectively; a



groove connected to and extending from the second opening, the groove reducing in cross sectional area away from the second opening and being arranged so that air may pass through the groove and second opening during movement of the chamber from the discharging to the filling position; a member movable in the chamber so as to adjust the volume thereof; and wherein the distance between the sealing surfaces remains constant independent of the volume of the chamber.

4,696,415

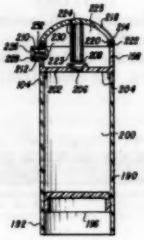
APPARATUS FOR DISPENSING PRODUCTS FROM A SELF-SEALING DISPENSER

Philip Meshberg, 2500 S. Ocean Blvd., Palm Beach, Fla. 33480

Filed Feb. 26, 1985, Ser. No. 705,657

Int. Cl.[4] B65D *37/00*; G01F *11/00*

U.S. Cl. 222—82 **8 Claims**



1. A vacuum pump for a dispenser having a primary compartment containing product to be dispensed comprising:

(a) means for defining a pumping compartment including a rigid base, generally cylindrical sidewall portion and movable means to reduce the volume of said compartment and dispense product therefrom;

(b) a spout, extending radially from said sidewall portion, comprising a channel cut therethrough, an inner opening communicating with one end of the channel and the pumping compartment, and an outer opening, through which product is dispensed, communicating with the other end of the channel and the ambient environment;

(c) a unitary self-sealing closure member mounted in the

spout having a sealing tip for closing said outer opening in said spout;

(d) means biasing said member into a position where said tip abuts the other end of the channel thereby closing said outer opening in said spout when said pumping compartment is in an unoperated position;

(e) said closure member responsive to movement of said pumping compartment movable means to move said tip out of said closed position;

(f) means for deterring backflow from said pumping compartment and dispensing a controlled dosage of product including a tapered flange terminating in an aperture in said rigid base and a valve element coupled to said movable means wherein said base separates the pump compartment from a primary compartment containing product to be dispensed;

(g) said valve element comprises a plunger for opening and closing said aperture during operation;

(h) said plunger includes stop means located at a predetermined intermediate position along the plunger for dispensing a predetermined dosage of product from the spout when the stop means contacts the tapered flange; and

(i) said aperture in said rigid base comprises a thin detachable section which breaks away from said base to form said aperture upon initial operation of said plunger.

4,696,416

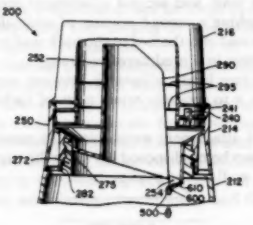
LIQUID PRODUCT DISPENSING PACKAGE WITH SELF DRAINING FEATURE EMPLOYING DRIP CONCENTRATOR

Delmar R. Muckenfuhs, Middletown, and Robert H. Van Coney, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 656,049, Sep. 28, 1984, abandoned. This application Jan. 30, 1987, Ser. No. 8,805

Int. Cl.[4] B67D *1/16*

U.S. Cl. 222—109 **20 Claims**



1. An improved package for dispensing liquid without contaminating the exterior surfaces of the package, said package comprising:

(a) a container for housing said liquid, said container having a dispensing orifice;

(b) a collar sealingly secured about its periphery to said dispensing orifice, said collar having an outwardly projecting pouring spout generally aligned with the vertical axis of said container, a circumscribing wall extending above the base of said pouring spout, said base of said pouring spout being joined about its periphery to said circumscribing wall by a drain back partition including a drain hole located at the lowermost point of said drain back partition; and

(c) a drip concentrating member originating in the lowermost surface of said drain back partition at the periphery of said drain hole and extending generally downwardly from said drain back partition to form a single, predetermined drip concentrating point comprising the lowermost extremity of said drip concentrating member in the interior of said container, said drip concentrating member being so configured and positioned relative to said dispensing orifice in said container that it does not restrict the flow of liquid passing through said dispensing orifice of said container during normal dispensing operations in which said container is not completely inverted, said drip concentrating member also being so oriented relative to said dispensing orifice in said container that it is substantially free of horizontal surfaces on which liquid can accumulate when said container is stored in an upright position intermediate dispensing cycles; whereby liquid deposited on the exterior of said drain back partition during dispensing will be drawn from said drain back partition by said drip concentrating member intermediate dispensing cycles and will coalesce to form a liquid droplet on said drip concentrating point, said droplet continuing to grow in size until such time as the weight of said droplet exceeds the surface tension forces exerted by the liquid comprising said droplet on said drip concentrating point, at which time said droplet falls back into said container, said coalescing cycle repeating itself until substantially all of said liquid deposited on the exterior of said drain back partition is returned to said container.

4,696,417

REFRIGERATED BEVERAGE DISPENSER, WITH WHIPPER DEVICE

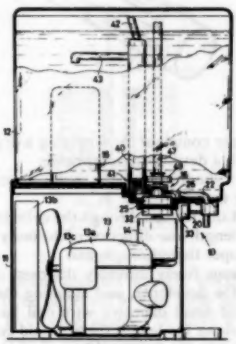
Giancarlo Ugolini, Milan, Italy, assignor to Ugolini S.p.A., Milan, Italy

Filed May 6, 1986, Ser. No. 860,047

Claims priority, application Italy, Mar. 28, 1986, 19912 A/86

Int. Cl.[4] B67D *1/10, 5/62*

U.S. Cl. 222—146.6 **10 Claims**



1. Refrigerated beverage dispenser and whipper device comprising:

a base having on an upper part at least one container,

a device for circulating and whipping a beverage housed within said at least one container, and communicating with the outside of the container,

motor means operatively linked by a magnetic transmission means to said circulating and whipper device and housed inside said base,

a refrigerator unit housed inside said base,

an evaporator of said refrigerator unit sealingly housed within said at least one container, said circulating and whipper device includes:

an impeller magnetically driven by said motor means,

a housing chamber having ports in communication with said at least one container and with the outside of said container, within which the said impeller is housed,

a pivot means housed inside said housing chamber and provided with a hollow interior in communication with holes on its upper part and on its lower part around which said impeller rotates,

a first pipe having a non-return valve in a peripheral portion of said housing chamber,

said first pipe being connected to a first of said ports in fluid communication between said container and said housing,

a bell-shaped structure provided in the lower part of said pivot means

said pivot means projecting through a second of said ports,

a second pipe inside which said pivot means ends, and having an upper end above the surface of a beverage within said container,

a float mounted coaxially to said pivot means, and to a portion of said chamber inside of which said pivot means is housed,

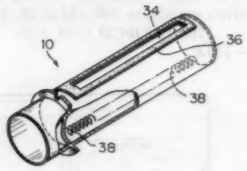
and said motor means is a single two-speed electrical motor controllable by a switch actuated from the outside of said container.

4,696,418

DEVELOPER CONTAINER FOR DRY-PROCESS DEVELOPMENT

Sigeo Kurotaka, Sagamihara, and Moriyosi Tukano, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 8, 1985, Ser. No. 763,606
Claims priority, application Japan, Aug. 20, 1984, 59-173919
Int. Cl.[4] B65D *23/04, 83/06*
U.S. Cl. 222—167 **2 Claims**



1. A developer container for supplying a dry-process developing unit with a developer, comprising:

a rotatable cylindrical hollow body accommodating the developer therein;

an elongated slot formed through the cylindrical wall of said body in a lengthwise direction of the body for discharging the developer therethrough; and

agitating means freely movably disposed in the body for agitating the developer, said agitating means comprising at least one small diameter wire coil having a constant diameter along the length thereof, said coil being dimensioned so as to be prevented from falling out of the container and having a length greater than that of said slot and substantially greater than a diameter of said hollow body, whereby rotation of said hollow body causes rotation of said coil so that said developer is scraped from said wall of said body.

4,696,419

HOLSTER

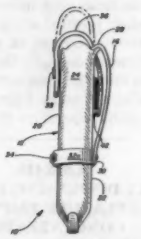
James O. Holtzclaw, Jr., Broomfield, and Marvin A. Novotny, Denver, both of Colo., assignors to The Hunter Company, Inc., Westminster, Colo.

Filed Jan. 14, 1986, Ser. No. 818,735
Int. Cl.[4] F41C *33/02*
U.S. Cl. 224—243 **4 Claims**

1. A handgun holster comprising:

a handgun-receiving pocket member having a back wall for disposition adjacent the wearer and a front wall defining a pocket for receiving a handgun, the pocket having an open upper end for receiving a handgun, the back wall having a slot therethrough;

a flexible support strap extending downwardly along the back wall, the support strap having an upper end connected to an upper portion of the back wall and a lower end releasably attached to a lower portion of the back wall by fastening means to enable the holster to be removably supported on a belt, said fastening means comprising a generally T-shaped subassembly having a fixed portion with a pair of horizontally spaced snap fastener members thereon and a movable fastening strap, said movable fastening strap having a free end and a snap fastener member affixed thereto, said support strap having complementary snap fastener members thereon for cooperation with the snap fastener members on the subassembly, said fastening strap being movable between a detached position in which it extends straight downward from said fixed portion of the subassembly, and an attached position in which it is bent around the lower end of the support strap in a generally U-shaped configuration and fastened thereto; and



a safety strap assembly comprising: a safety strap of predetermined length spanning the opening at the upper end of the pocket member and passing through the slot in said back wall, first attachment means for releasably attaching a first portion of said safety strap adjacent a first end thereof to the front wall at a predetermined location on the front wall, and second attachment means for releasably attaching a second portion of said safety strap adjacent a second end thereof to the back wall of the holster at any position in a predetermined range;

the safety strap being adjustable between various positions to enable it to securely retain guns of various sizes in the pocket;

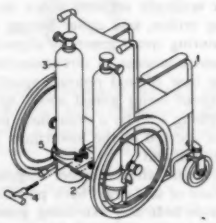
said second attachment means and the second end of the safety strap being disposed between the support strap and the back wall of the pocket member.

4,696,420

OXYGEN CARRIER

Helmut Kulik, 169 Green Pond Rd., Rockaway, N.J. 07866

Filed Jan. 17, 1986, Ser. No. 800,170
Int. Cl.[4] B60R *7/00;* **A47C** *7/62*
U.S. Cl. 224—275 **1 Claim**



1. An oxygen tank carrier for use on a wheelchair, said wheelchair including two downwardly directed support arms on which the rear wheels are supported, said oxygen tank carrier comprising, two plates hinge together, each plate in-

cluding a notch at the end farthest from the hinge, said notches engaging said downwardly directed support arms, said plates are pushed down in between said support arms, said plates including holes therein to accommodate an oxygen tank, each hole having a clamp associated therewith to secure the oxygen tank to said carrier, each said clamp being tighted to the tank with an Allan wrench and associated Allan screw.

4,696,421

METHOD OF DEBURRING OR DEFLASHING ARTICLES

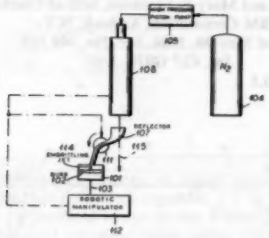
Dieter Dürr, Baierbrunn, Fed. Rep. of Germany, assignor to Linde AG, Wiesbaden, Fed. Rep. of Germany

Filed Mar. 20, 1986, Ser. No. 841,555

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1985, 3510964; Dec. 12, 1985, 3543910

Int. Cl.[4] B26F *3/00*; B29C *37/02, 35/16*

U.S. Cl. 225—1 **13 Claims**



1. In a method of removing a flashing from an article having a flashing waste projecting from a body of the article and in which the flashing can be embrittled by a cryogenic coolant and the embrittled flashing can be broken away from the body, the improvement which comprises the steps in combination of:

initially embrittling said flashing by subjecting said flashing to a cryogenic coolant; and

thereafter training a jet substantially consisting exclusively of said cryogenic coolant upon said flashing and controlling the flow velocity of said jet so that the flashing waste is broken away solely by the force and energy of said jet after embrittlement of said flashing waste, at least a portion of said jet being deflected onto said flashing initially to embrittle said flashing before the full jet is directly trained on said flashing to cut away said flashing.

4,696,422

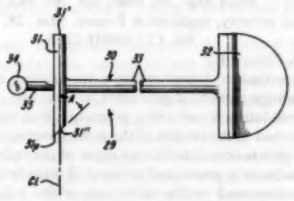
HAND-HELD TAG ATTACHER, METHOD OF ATTACHING TAGS AND FASTENERS

Larry D. Strausburg, Kettering, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 654,333, Sep. 25, 1984, Pat. No. 4,673,120. This application Sep. 22, 1986, Ser. No. 909,661

Int. Cl.[4] A43D *69/00*; B23P *19/02, 19/04*

U.S. Cl. 227—39 **16 Claims**



1. A hand-held tag attacher for attaching tags to merchandise using fasteners, each fastener having a bar section and a button section joined by a filament section, the tag attacher comprising: an attacher body having a hopper for holding a stack of tags and having a handle, a needle mounted to the body and having an elongate needle bore and an elongate side opening communicating with the needle bore, the needle having a pointed front end, means for feeding bar sections of fastener one-at-a-time into alignment with the needle bore, the body having a hopper for receiving a stack of tags, means for feeding one tag at a time from the hopper to a position behind the needle, a push rod engageable with a bar section of a fastener for driving the bar section through the tag and into and through the needle bore to attach the tag to merchandise, and means including a manually engageable actuator disposed at the handle, for moving the tag feeding means, the fastener feeding means and the push rod.

4,696,423

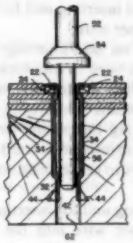
HIGH CAPACITY SHEAR FASTENER

John L. Ryan, 2814-27th West, Seattle, Wash. 98199

Continuation-in-part of Ser. No. 567,274, Dec. 30, 1983, abandoned. This application Mar. 5, 1986, Ser. No. 837,010

Int. Cl.[4] B21J *15/04, 15/10*

U.S. Cl. 227—55 **7 Claims**



1. A tool for joining together wood or wood product assemblies designed to be subjected to high shear and bending stress loadings, said tool being adapted to drive a fastener into a prebored lead hole in the assemblies, the fastener being of the type comprising a hollow shaft core of predetermined dimensions formed by a plurality of shaft sides with a plurality of driving head flanges at one end of the hollow shaft core,

said tool comprising:

an adapter shank for mating with and transmitting driving force from a mechanical power source;

a circular driving flange attached to said shank, said flange having a generally concave driving face adapted to mate with the fastener driving head flanges and designed to vector the driving force from the mechanical power source inwardly toward the hollow shaft core and into the shaft sides;

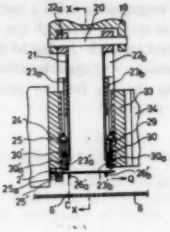
an elongated, round, rigid rod attached to said shank and said circular driving flange, said rod being adapted to be inserted into the hollow shaft core with a light friction fit;

whereby a desired alignment of the prebored lead hole, the fastener, the tool and the mechanical power source can be maintained prior to and during driving of the fastener into the assemblies under severe mechanical impacting and compressive resistance while preventing both longitudinal and transverse deformation of the fastener and while maintaining design integrity of the fastener.

4,696,424
JUMPER WIRE INSERTING APPARATUS

Yoshihiko Misawa, Katano; Taira Ishii, Hirakata, and Yoshinobu Maeda, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 13, 1984, Ser. No. 671,127
Claims priority, application Japan, Nov. 14, 1983, 58-214375; Nov. 14, 1983, 58-214379; Nov. 14, 1983, 58-214380
Int. Cl.[4] B27F 7/21
U.S. Cl. 227—84 5 Claims



1. Jumper wire inserting apparatus comprising:
a bobbin on which wire is wound;
an inserting unit;
jumper wire sending means for sending wire from said bobbin to said inserting unit, said sending means including means to control the length of the sent wire to be proportionate to the pitch of a pair of holes in a printed circuit substrate;
cutting means on said inserting unit for cutting the sent wire to produce a jumper wire;
transforming means on said inserting unit for bending the ends of the jumper wire to transform it to a length corresponding to the pitch of the hole pair,
said transforming means comprising first fixed members adjacent said cutting means and first movable members spaced from and adjustable toward and away from said first fixed members to correspond to the pitch of the hole pair;
means on said inserting unit for inserting the bent ends of the transformed jumper wire into the pair of holes in the printed circuit substrate, said inserting means comprising a second fixed member adjacent said cutting means and a second movable member adjustable, with said first movable members, toward and away from said second fixed member to correspond to the pitch of the hole pair; and
means connected to said transforming means, to said inserting means and to said sent wire length control means for simultaneously adjusting said first movable members, adjusting said second movable member and controlling the length of the sent wire.

4,696,425
PROGRAMMABLE ULTRASONIC POWER SUPPLY

James L. Landes, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

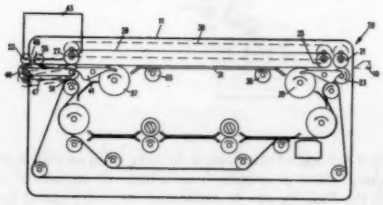
Filed Jul. 17, 1984, Ser. No. 631,658
Int. Cl.[4] B23K 1/06, 20/10
U.S. Cl. 228—1.1 19 Claims

1. A generator for providing ultrasonic power to a wire bonder for connecting wires from locations on an integrated circuit to locations on a lead frame carrying said integrated circuit, comprising:
means for generating ultrasonic power for application to said bonder having voltage and current envelope waveforms dynamically controllable during formation of a bond to have one of a plurality of different, predetermined shapes, and
programmed digital computer means for continuously controlling during formation of the bond at least the amplitude of at least said voltage envelope waveform to have one of a plurality of different, predetermined shapes.

4,696,426
DOCUMENT READING ENVELOPE DEPOSITORY

Dale D. Decker, and Mary E. Stanhope, both of Charlotte, N.C., assignors to IBM Corporation, Armonk, N.Y.

Filed May 30, 1986, Ser. No. 869,169
Int. Cl.[4] G07G 5/00
U.S. Cl. 232—43.1 11 Claims



1. A depository comprising:
a single opening for receiving both envelopes and single document deposit items;
a common transport for receiving said deposit items from said opening;
a thickness detector mounted between said opening and an input end of said common transport for detecting whether a deposit item is a single document;
a diverter mounted at an output end of said common transport for diverting single documents from said common transport to an input end of a read transport;
said diverter passing deposit items which are envelopes to a deposit receiving means.

4,696,427
METHOD OF TRANSFORMING A PRE-EXISTING HEAT INSTALLATION, AND CONTROL DEVICE FOR IMPLEMENTING THE METHOD

Jacky Pichot, La Grande Paroisse, and Jacques Oddou, Fontainebleau, both of France, assignors to Electricite de France, France

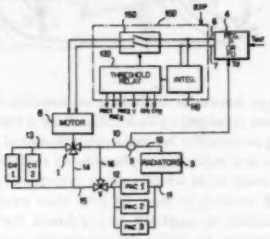
Filed Mar. 25, 1986, Ser. No. 843,702
Claims priority, application France, Mar. 28, 1985, 85 04665
Int. Cl.[4] G05D 23/00
U.S. Cl. 236—1 E 17 Claims

1. A method of transforming a pre-existing heating installation having a main heat generator, at least one radiator, a three path modulating mixer valve wherein a first path of said valve is connected to the output of the main generator, a second path of the valve is connected to the input of the radiator, the output of the radiator is connected to input of main heat generator and is also connected to the third path of the valve, a motor for controlling opening and closing of the valve, a first probe measuring the outside temperature T_{ext}, a second probe disposed between the second path of the valve and the input of

the radiator to measure the departure temperature T_d of the fluid supplied to the radiator, a comparator-regulator which compares the outside temperature T_{ext} and the departure temperature T_d and which generates on two outputs of the comparator-regulator two on/off signals for actuating said motor, said method comprising the steps of

(1) adding a plurality of auxiliary heat generators in the form of heat pumps which are connected in parallel between the output of the radiator on the one hand and the input of the main heat generator and the third path of the valve on the other hand,

(2) adding between said comparator-regulator and said motor controlling the mixer valve a control device which comprises:



an integrator module having its inputs connected to the outputs of the comparator-regulator,

a plurality of threshold relays having respectively different thresholds, said threshold relays being controlled by the output of said integrator module, so as to bring into service in succession the auxiliary heat generators, and to bring into service the main heat generator when the signal output by the integrator module exceeds a predetermined threshold, and

a switch controlled by said threshold relays, said switch being closed when the signal output by the integrator module exceeds said predetermined threshold to apply the on/off signals generated by the comparator-regulator to said motor.

4,696,428

ELECTRONIC FLUID TEMPERATURE FLOW CONTROL SYSTEM

Paul Shakalis, 19 Gordon Ave., Plainview, N.Y. 11803

Filed Jul. 10, 1986, Ser. No. 884,051

Int. Cl.[4] G05D *23/13*

U.S. Cl. 236—12.12 **14 Claims**

1. An electronic fluid temperature and flow control system comprising:

(a) a source of hot and cold pressurized fluid;

(b) a dual temperature mixing valve which, at its output, controls the ratio of said hot to said cold fluid;

(c) a mixing valve actuator motor which activates said dual temperature mixing valve depending upon electrical signals inputted to said motor;

(d) a fluid outlet;

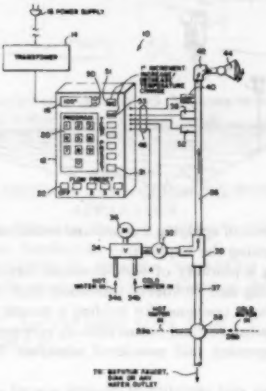
(e) a connecting type, one end of which is connected to said fluid outlet;

(f) an electrically controlled volume flow control valve connected between the output of said dual temperature mixing valve and the end of said connecting tube opposite said fluid outlet such that the volume fo fluid released from said fluid outlet is modulated according to electrical signals inputted to said volume control valve;

(g) a temperature sensor, mounted to said connecting tube, such that the electrical output of said temperature sensor is proportional to the temperature of fluid passing through said connecting tube;

(h) a flow sensor, mounted to said connecting tube, such that the electrical output of said flow sensor is proportional to the rate of flow of said fluid passing through said connecting tube;

(i) an electrical controller which uses the signal outputted by said temperature sensor to modulate the signal inputted to said mixing valve actuating motor, thereby controlling the temperature of the fluid discharge from said fluid outlet; and, also uses the signal outputted by said flow sensor to modulate the signal inputted to said volume flow control valve, thereby controlling the rate of flow of the fluid discharged from said fluid outlet; and,



(j) a T-fitting, two of whose legs are connected between the output of said volume control valve and said connecting tube, wherein the third leg is connected to a conventionally manually controlled source of pressurized liquid, so that when said volume flow control valve is turned off, said conventional source is capable of being used to manually control the temperature and rate of flow of liquid discharged from said water outlet.

4,696,429

ELASTIC MAT FOR A BALLAST BED UNDERLAYMENT

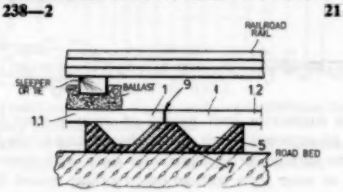
Hermann Ortwein, Cologne, Fed. Rep. of Germany, assignor to Clouth Gummiwerke Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Jul. 11, 1985, Ser. No. 754,029

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425647

Int. Cl.[4] E01B *2/00, 19/00*; E01C *3/06, 5/18*

U.S. Cl. 238—2 **21 Claims**



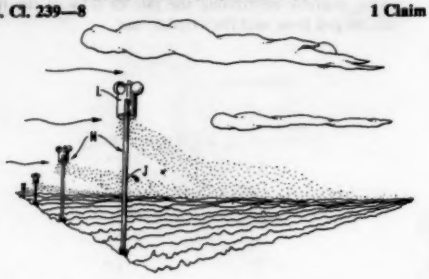
1. The combination with a railway road bed and a ballast of a ballast-underlayment mat disposed between said bed and said ballast and comprising an elastic body formed on an underside with a plurality of projections and along an upper side with an upper layer of a high-strength fabric exposed to penetrating tendencies of the ballast.

4,696,430

METHOD AND APPARATUS FOR APPLYING POWDERED SUBSTANCES ON FARM FIELDS, FORRESTS AND SWAMP AREAS

Genaro C. Hernandez, Paseo de las Fuentes, 4412 Frace, Villa de las Fuentes, Monterrey, Nuevo Leon, Mexico

Division of Ser. No. 757,938, Jul. 23, 1985, Pat. No. 4,609,152.
This application May 12, 1986, Ser. No. 861,717
Int. Cl.[4] A62C *1/12*; B05B *17/00*
U.S. Cl. 239—8 1 Claim



1. A method of applying a powdered substance over a given area, comprising the steps of:

providing a plurality of wind-powered devices for slowly dispersing said powdered substance, each of said devices including a container for holding a quantity of said powdered substance and means directly powered by the wind for dispensing said powdered substance from said container;

positioning said plurality of devices spaced apart in a grid avove the given areas; and

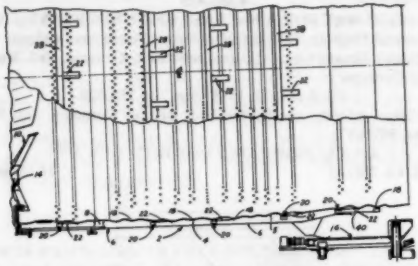
placing a quantity of the powdered substance in said containers of one or more of the devices.

4,696,431

AUGMENTOR LINER SUPPORT BAND HAVING FINGER POSITIONERS

Paul M. Buxe, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 29, 1985, Ser. No. 803,048
Int. Cl.[4] B64D *33/04*
U.S. Cl. 239—265.15 13 Claims



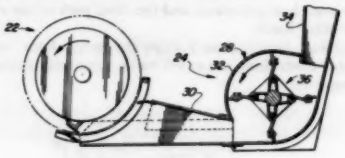
1. An augmentor liner having an outer surface for a jet engine; an augmentor liner support band being located around the outer surface of the augmentor liner; said support band having an inner strip with an inner surface spaced from the outer surface of the liner, an outer strip spaced from said inner strip, and a corrugated strip located between said inner strip and outer strip; means fixing said strips together, said corrugated strip permitting flow through said support band; said inner strip having a plurality of axially extending flexible fingers for fixing said support band in place; said axially extending flexible fingers permitting flow therebetween; each axially extending flexible finger being fixedly attached to an axially spaced portion of said augmentor liner.

4,696,432

FORAGE HARVESTER BLOWER

Roger A. Russ, and John J. Hennen, both of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Apr. 25, 1986, Ser. No. 855,658
Int. Cl.[4] B02C *18/22*
U.S. Cl. 241—101.7 5 Claims



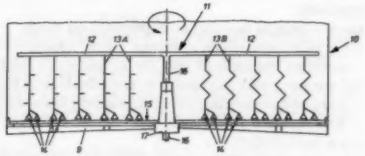
1. In a forage harvester including an impeller housing including a section arranged cylindrically about a horizontal axis and containing an impeller having a rotor mounted for rotation about said axis and including a plurality of radially extending blades having outer ends which trace a cylindrical path spaced closely to said housing section, an inlet duct extending fore-and-aft substantially tangentially into a lower forward quadrant of said housing, an outlet duct extending upwardly substantially tangentially out from an upper rear quadrant of said housing, and a rotary crop handling apparatus mounted for delivering crop tangentially into an outer portion of the blades, the improvement comprising: said rotor includes a shaft having a pair of radially extending plates fixed thereto at axially spaced locations; a plurality of equiangularly spaced uniform diameter, straight rods arranged parallel to said shaft and being axially shiftably received in said pair of plates for permitting their selective removal therefrom; releasable securing means for preventing axial movement of each rod relative to the pair of plates and at least one blade being pivotally mounted on each rod.

4,696,433

BREAKING UP DEVICE FOR USE IN STRAINING TUNS TO OBTAIN WORT IN THE PRODUCTION OF BEER

Bernhard Lenz, and August Lenz, both of D-8710, Kitzingen, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 888,370
Claims priority, application Fed. Rep. of Germany, Aug. 9, 1985, 3528647
Int. Cl.[4] B02C *18/10*
U.S. Cl. 241—199.12 15 Claims



1. Breaking up device for use in a straining tun having a filter base to obtain wort in the production of beer, the device comprising laterally extending arms fastened to an upright, rotatable shaft, the arms supporting a row of radially spaced cutting blades having bottom ends, cutting shoes fastened to the bottom ends of the cutting blades in order to loosen up brewer's grain cakes on the filter base of the straining tun along different circular paths when the shaft is rotated, characterized in that at the bottom end of each cutting blade (13) are arranged at least two cutting shoes (14) side by side, so that an intensified loosening up of the brewer's grain cake is produced by the cutting

shoes (14) of each blade (13) rotating on different circular paths.

4,696,434

CUTTER HEAD FOR MEAT CUTTER

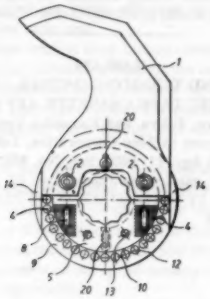
Paul Vomhof, Bad Laasphe; Karlheinz Schmidt, Steffenberg-Quotshausen, and Peter Oster, Biedenkopf-Wallau, all of Fed. Rep. of Germany, assignors to Kramer & Grebe GmbH & Co. KG, Biedenkopf-Wallau, Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 864,132

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518530

Int. Cl.[4] B02C *18/18*

U.S. Cl. 241—282.2 **13 Claims**



1. A cutter head for a meat cutter comprising

a cutter adjustable in a radial direction;

a securing disk for mounting said cutter positively locked to a rotatable shaft;

holding means allowing radial adjustment and axially securing said cutter to said securing disk;

said securing disk having at least one toothed area on a front surface of said securing disk having teeth forming grooves and ridges extending outward from the plane of said securing disk;

at least one securing bolt means for securing said cutter to said securing disk in the radial direction and penetrating an aperture in said cutter, said securing bolt means having a front toothing with grooves and ridges complementary to said toothed area of said securing disk for adjustment in the radial direction.

4,696,435

METHOD AND DEVICE FOR AVOIDING THE FORMATION OF IRREGULAR TURNS DURING THE WINDING OF A CROSS-WOUND COIL

Ferdinand-Josef Hermanns, Erkelenz, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Moenchen-Gladbach, Fed. Rep. of Germany

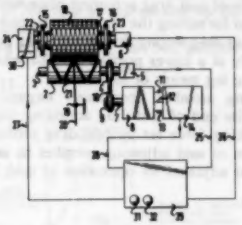
Filed Jun. 12, 1986, Ser. No. 873,392

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521152

Int. Cl.[4] B65H *54/38*

U.S. Cl. 242—18.1 **10 Claims**

1. Method of avoiding the formation of irregular thread turns during the winding of a cross-wound coil driven by a drive drum formed with reversing thread grooves cooperating with a thread guide, a rotating element connectible to the cross-wound coil being braked with a varying braking force, which comprises the steps of continuously varying the peripheral velocity of the drive drum, and simultaneously braking, at least one of the cross-wound coil and the rotating element connected thereto, with a variable braking force in such manner that the peripheral velocity of the cross-wound coil remains constant within given tolerance limits.



4,696,436

MULTI-POSITION YARN SPINNING/WINDING APPARATUS

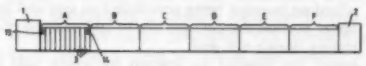
John Whiteley, Clitheroe, England, assignor to Hollingsworth (UK) Limited, Accrington, England

Filed Oct. 16, 1986, Ser. No. 920,101

Claims priority, application United Kingdom, Jun. 20, 1986, 8615090

Int. Cl.[4] B65H *54/20, 54/28*

U.S. Cl. 242—35.5 R **10 Claims**



1. Multi-position yarn handling machine including:

(a) a plurality of yarn handling positions along the machine;

(b) respective yarn package-forming means including a package former at each said position;

(c) respective traverse guide means for each package-forming means for traversing the yarn across said package former; and

(d) means driving the traverse guide means such that at least the majority of said traverse means execute traverse guide motions phased such that pairs of said positions which are not necessarily alongside one another but are on the same side of the machine have the traverse guide motions of their traverse means directly out of phase, wherein said pairs comprise a first pair having a first phase angle and a second pair having a second phase angle, such that the first phase angle is less than 180° displaced from the second phase angle.

4,696,437

DRAG ADJUSTING DEVICE FOR A CLOSED-FACE TYPE FISHING REEL

Osamu Yoshikawa, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Continuation of Ser. No. 740,520, Jun. 3, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 885,743

Int. Cl.[4] A01K *89/01, 89.02*

U.S. Cl. 242—84.5 A **1 Claim**

1. In a closed-face type fishing reel including a reel body, a spool supported rotatably to said reel body, and a drag adjusting device for applying a braking force against rotation of said spool, said device comprising:

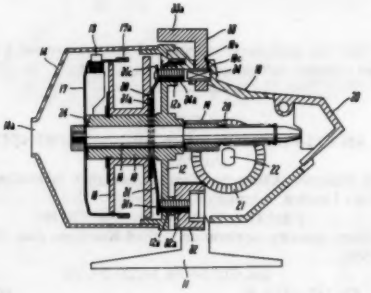
a brake plate disposed at one axial side of said spool,

a drag actuating plate having two lengthwise ends extending radially relative to said spool and urging said brake plate toward a side of said spool to apply a braking force to said

spool, said two lengthwise ends being disposed at a phase difference of about 180° relative to one another,

a drag setting thumb nut operatively engaged with one lengthwise end of said drag actuating plate, for changing a position of said drag actuating plate with respect to said spool and for setting the braking force to be applied to said spool, said drag setting thumb nut being positioned on said reel body at a lower portion thereof which is close to a mounting leg means of said reel,

an adjusting member operatively engaged with another lengthwise end of said drag actuating plate for adjusting said braking force set by said drag setting thumb nut by operation of said adjusting member in an amount larger than that adjusted by operation of said thumb nut, said



adjusting member being positioned on said reel body at an upper portion thereof opposite to said position of said drag setting thumb nut, and

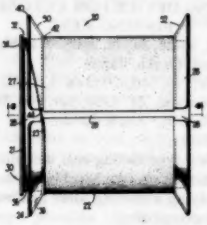
a means for limiting an amount by which said adjusting member can adjust said braking force within a predetermined range, said adjusting member comprising a lever supported by a shaft member including a first screw means screwably supported by a second screw means mounted on said reel body, for holding said adjusting member at an adjustment position to which said adjusting member has been moved by an angler, wherein said drag setting thumb nut is scewably supported to said reel body and said first screw means has a thread pitch which is larger than a thread pitch by which said drag setting thumb nut is supported to said reel body.

4,696,438

SPOOL FOR HOLDING OPTICAL FIBER

Daryl L. Myers, Lawrenceville, Ga., assignor to American Telephone and Telegraph Company AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed Oct. 24, 1986, Ser. No. 922,593
Int. Cl.[4] B65H *55/00, 75/14*
U.S. Cl. 242—118.41 **13 Claims**



1. A spool which is adapted to hold convolutions of an optical fiber, said spool comprising:

a hub having a longitudinal axis and a cross sectional configuration which is normal to the longitudinal axis and which is generally circular;

first and second flanges being attached to opposite ends of said hub with each of said flanges having a truncated conical shape with a large diameter portion thereof facing outwardly and a small diameter portion thereof being attached to said hub and further with said first flange including a slot which is formed radially through said first flange; and

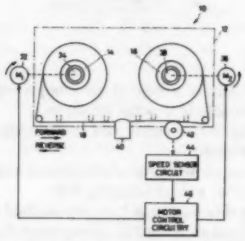
a collector attached to said first flange for accumulating a few convolutions of the optical fiber to provide access to an end portion of the optical fiber, said collector including a flange and a peripheral surface on which the convolutions are wound with said slot in said first flange having sufficient width and the thickness of said first flange being sufficiently thin to minimize the curvature of a portion of the optical fiber which extends through said slot from convolutions in said collector to convolutions on said hub.

4,696,439

TAPE SPEED AND TENSION CONTROL SYSTEM FOR A MAGNETIC TAPE CASSETTE APPARATUS

Motoyuki Sukigara, Tokyo, and Kazuhiko Yasuda, Fussa, both of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Apr. 11, 1986, Ser. No. 850,757
Claims priority, application Japan, Apr. 12, 1985, 60-78063
Int. Cl.[4] G11B *15/32, 15/46, 15/54*
U.S. Cl. 242—186 **7 Claims**



1. In an apparatus for use with a magnetic tape cassette of the type having a length of magnetic tape which extends between first and second hubs within a housing for travel in both forward (from the first to the second hub) and reverse (from the second to the first hub) directions and which is partly exposed through a series of apertures defined in the front edge of the cassette housing, the apparatus including a magnetic head for relative sliding contact with the tape of the tape cassette through a centrally located one of the apertures in the cassette housing, a tape transport and tape speed and tension control system comprising:

(a) a first variable speed drive motor for driving the first cassette hub;

(b) a second variable speed drive motor for driving the second cassette hub;

(c) a speed sensing roller arranged for frictional engagement with the tape through another of the apertures in the cassette housing which is closer to the second cassette hub than to the first cassette hub;

(d) a speed sensor circuit driven by the speed sensing roller for generating an electric tape speed signal representative of actual tape speed;

(e) a motor drive circuit connected to the speed sensor circuit and responding to the tape speed signal for putting out a motor drive signal for delivery to a takeup side one of the drive motors for constant tape speed during tape travel in either direction;

(f) first switching means for causing the motor drive signal to be applied to the first drive motor during tape travel in

the reverse direction, and to the second drive motor during tape travel in the forward direction;

(g) a tape tension control circuit for generating a tape tension signal in response to a tape reel diameter signal indicative of the increasing diameter of the tape reel on a takeup side one of the cassette hubs during tape travel in either direction, the tape tension signal increasing in magnitude with the increase in the diameter of the tape reel on the takeup side one of the cassette hubs;

(h) second switching means connected between the tape tension control circuit and the first and second drive motors for applying the tape tension signal to the first drive motor during tape travel in the forward direction and to the second drive motor during tape travel in the reverse direction, either of the first and second drive motors when applied with the tape tension signal of increasing magnitude being effective to exert increasing tension on the tape; and

(i) a reverse tape tension drop circuit connected to the tape tension control circuit for making the tape tension signal smaller in magnitude during reverse tape travel than during forward tape travel under the condition of the same tape reel diameter on a takeup side one of the cassette hubs;

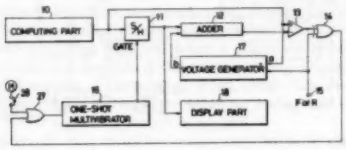
(j) whereby the tape tension is rendered approximately the same at the magnetic head during forward and reverse tape travels under the condition of the same tape reel diameter on a takeup side one of the cassette hubs, in the face of the dynamically asymmetrical tape path due to the offset arrangement of the speed sensing roller in frictional engagement therewith.

4,696,440

INFORMATION SIGNAL AND/OR REPRODUCING APPARATUS

Isao Harigaya, and Kouji Takahashi, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha

Continuation of Ser. No. 727,584, Apr. 26, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,540
Claims priority, application Japan, Apr. 28, 1984, 59-86888
Int. Cl.[4] B65H *61/00*; G03B *1/16*
U.S. Cl. 242—191 **11 Claims**



1. An information signal recording and/or reproducing apparatus for recording and/or reproducing an information signal on or from a tape-shaped record bearing medium wound around a pair of reels by allowing the record bearing medium to travel in a longitudinal direction thereof, said information signal recording and/or reproducing apparatus comprising:

(a) detecting means for detecting a rotating speed of at least one of said pair of reels to produce a first information;

(b) computing means for computing an amount of a portion of said tape-shaped record bearing medium wound on one of said pair of reels based on said first information to produce a second information;

(c) display means for making a display in response to said second information; and

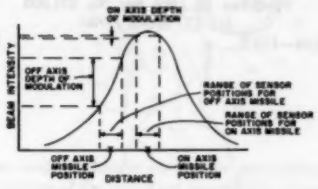
(d) changing means for changing a display step of said second information by said display means on the basis of said first information.

4,696,441

MISSILE REFERENCED BEAMRIDER

Michael M. Jones, Arab; Walter E. Miller, Jr., and Robert R. Mitchell, both of Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 6, 1986, Ser. No. 860,354
Int. Cl.[4] F41G *7/26*
U.S. Cl. 244—3.13 **4 Claims**


ON AXIS DEPTH OF MODULATION
BEAM INTENSITY
OFF AXIS DEPTH OF MODULATION
RANGE OF SENSOR POSITIONS FOR OFF AXIS MISSILE
RANGE OF SENSOR POSITIONS FOR ON AXIS MISSILE
OFF AXIS MISSILE POSITION
DISTANCE
ON AXIS MISSILE POSITION

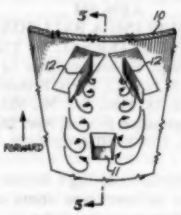
1. A method for generating guidance signals to a rotating missile comprising the steps of generating and transmitting a guidance beam having a center position along which the missle is to be guided, said guidance beam having a cross section such that the amplitude of the intensity of the beam will decrease as a function of the distance from the center of the beam, locating a sensor off axis on said rotating missile for sensing said amplitude of said guidance beam and generating a modulation signal, detecting modulation signal of said sensor for generating a guidance signal, detecting phase of the modulation signal of said sensor for determining a pointing direction towards the center of said guidance beam; generating and transmitting a reference beam having a cross section in which there is no change in the amplitude of the intensity of the reference beam respective to distance from the center of the reference beam, and said sensor detecting this reference beam amplitude so that a function of the distance a missile is from the center of said guidance beam can be generated.

4,696,442

VORTEX GENERATORS FOR INLETS

Frederick Mazzitelli, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 14, 1986, Ser. No. 885,062
Int. Cl.[4] B64D *33/02*
U.S. Cl. 244—53 B **11 Claims**



1. Inlet fluid flow inducing means, comprising: a pair of fin-like elements mounted upstream to the direction of free stream fluid flow over an inlet; said pair of fin-like elements being spaced apart normal to the direction of the free stream fluid flow for producing a pair of trailing vortex filaments therefrom; said pair of trailing vortex filaments, in cross-section, having adjacent counter-rotating vortices that merge in a similar-directional fluid flow into a downstream area between the fin-like elements and the inlet; said pair of fin-like elements being optimally spaced apart normal to the direction of the free

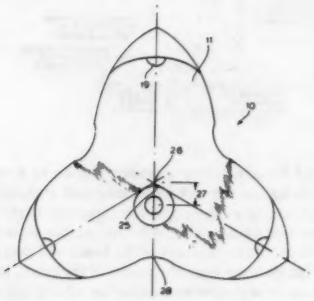
stream fluid flow to insure that the pair of trailing vortex filaments produced therefrom, are divergently swept apart to pass astride the inlet in order that no vortices are ingested by the inlet; thereby, inducing a higher mean total pressure in the fluid mass flow ingested by the inlet.

4,696,443

SCATTERABLE RAM AIR DECELERATOR

Alexey T. Zacharin, 37 Copeland Rd., Denville, N.J. 07834

Filed Jan. 21, 1986, Ser. No. 821,035
Int. Cl.[4] B64D *17/80*
U.S. Cl. 244—113 **10 Claims**



1. An inflatable decelerator for deployment with an attached load unit in an airstream comprising:

an inflatable chamber having a center and having a plurality of radially outwardly projecting lobes relative to the center and in spaced-apart relationship to each other;

at least one air inlet means for inletting air to the inflatable chamber;

air scoop means operatively related to each said air inlet means for capturing a portion of external airflow around said chamber and directing said portion into said inlet to inflate said chamber; and

a mounting means for mounting a body to the inflatable decelerator, said mounting means being affixed to the inflatable decelerator at a location offset from the center of the inflatable chamber whereby a lateral force is exerted on the decelerator during descent in to an air stream to cause lateral drifting of the decelerator.

4,696,444

DEVICE FOR COUPLING A BALLOON ENVELOPE WITH AN ELEMENT EXTERNAL TO THE ENVELOPE

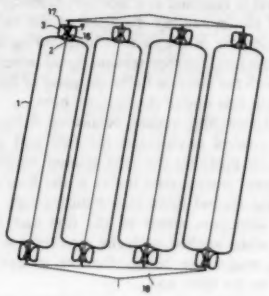
Robert Regipa, Toulouse, France, assignor to Centre National d'Etudes Spatiales (C.N.E.S.), Paris, France

Filed Apr. 18, 1986, Ser. No. 853,446
Claims priority, application France, Apr. 25, 1985, 85 06465
Int. Cl.[4] B64B *1/40, 1/50*
U.S. Cl. 244—127 **11 Claims**

1. A coupling device for coupling a flexible ballon envelope **(1)** having symmetry of revolution about an axis, with an external element, said device comprising:

a ballonet **(3)** made of flexible material, having symmetry of revolution about an axis and having two fasteners **(4, 5)** located on the axis of revolution on two opposite zones of the surface of said ballonet, said fasteners **(4, 5)** being connected to a harness of high tensile-strength cables **(7, 17)** for providing their relative positioning, in a position where at least one of said fasteners **(5)** is kept away from the corresponding zone of the surface of said ballonet,

means **(2, 16)** for coupling the envelope and one of said fasteners **(5)** of the ballonet **(3)**, fitted to position the axis of revolution of said ballonet approximately in the extension of the axis of revolution of the envelope, so as to create a contact surface **(Z1)** between said ballonet **(3)** and said envelope, away from said axis of revolution, and



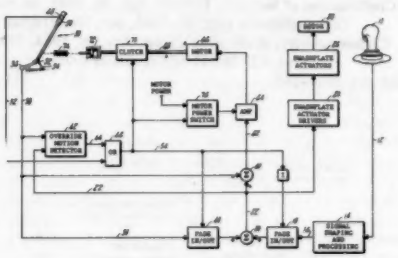
link means **(8–15)** for connecting the other of said fasteners **(4)** of said ballonet **(3)** to the external element.

4,696,445

COLLECTIVE CONTROL SYSTEM FOR A HELICOPTER

Stuart C. Wright, Woodbridge; Lorren Stiles, Jr., Woodbury, and Don L. Adams, Fairfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 18, 1986, Ser. No. 909,046
Int. Cl.[4] B64C *13/12*
U.S. Cl. 244—229 **4 Claims**



1. A helicopter collective control system comprising:

a summing junction **(20)** for providing a collective position command signal to a mechanism for determining the collective pitch of the helicopter main rotor blades;

a multi-axis, force-type control stick **(10)** operable to provide a first signal indicative of a desired blade collective pitch;

a displacement-type control stick **(30)** and associated position transducer operable to provide a second signal indicative of a desired blade collective pitch;

first means **(18)** for alternately fadeing in or out the first signal to the summing junction **(20)**;

second means **(40)** for alternately fading in or out the second signal to the summing junction **(20)**;

third means for simultaneously causing the first means **(18)** to fade in and the second means **(40)** to fade out, and for alternately simultaneously causing the first means **(18)** to fade out and the second means to fade in.

4,696,446

SYSTEM FOR DETECTING FLAT PORTION OF PERIPHERAL SURFACE OF VEHICLE WHEEL

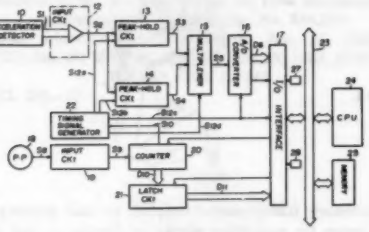
Asahi Mochizuki, Yokohama; Kira Ozawa, Mie; Shinichiro Fujita, and Kuniaki Yamada, both of Tokyo, all of Japan, assignors to Shinko Electric Co. Ltd. and Japanese National Railways, both of Tokyo, Japan

Filed Mar. 20, 1984, Ser. No. 591,535

Claims priority, application Japan, Apr. 7, 1983, 58-61472

Int. Cl.[4] B61L *1/20*; B61K *13/00*

U.S. Cl. 246—169 S **1 Claim**



1. A system for detecting a flat portion of a peripheral surface of a wheel mounted on a vehicle in rolling engagement with a track rail, comprising:

a. means mounted on the vehicle in the vicinity of the wheel for detecting vibrations of the wheel caused by the rolling of the wheel on the rail, and producing a first detection signal representative of the magnitude of the vibrations;

b. rotation detecting means mounted on the vehicle for detecting the rotation of the wheel and producing a predetermined number of pulses for each rotation of the wheel;

c. memory means having a plurality of storage areas, each having a plurality of memory locations equal in number to said pulses produced during one rotation of the wheel, said memory means further storing data representative of the relationship between the length of a flat portion and the vibration of the wheel;

d. addressing means, responsive to said pulses, for addressing the memory locations of said memory means to sequentially store data corresponding to said first detection signal into said memory locations over said plural storage areas in accordance with the rotation of the wheel;

e. means for comparing the data stored in said plurality of memory locations to detect a flat portion of the wheel when one of the data abruptly increases from the immediately-preceding data and when a difference between said one data and the data in the corresponding-disposed memory locations of the storage areas, other than the storage area in which the memory location storing said one data, is below a predetermined level; and

f. flat length determination means responsive to said detection of a flat portion for reading the data in memory to determine the length of the wheel flat based on the data in memory and said one data.

4,696,447

BLOW DRYER HOLDING DEVICE

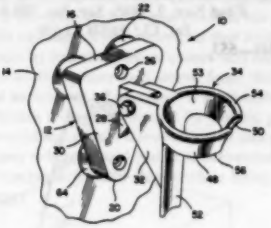
Dennis Strecker, 1079 Colonial Club Dr., Harahan, La. 70123

Filed May 12, 1986, Ser. No. 861,997

Int. Cl.[4] F16B *47/00*

U.S. Cl. 248—206.3 **13 Claims**

1. A device for holding a portable hair dryer on a vertical surface, the hair dryer having a rigid handle portion and an air discharge portion, said holding device including a base, means for attaching the base to the vertical surface and retainer means for receiving the handle portion of the hair dryer in spaced relation to the base, the improvement comprising means pivotally connecting the retainer means to the base for angular displacement about a pivot axis to an adjusted position, frictional means connected to the pivotal connecting means for holding the retainer means in said adjusted position and elongated abutment means depending from the retainer means in



engagement with the handle portion for maintaining the air discharge portion of the hair dryer operatively oriented about vertical axis within the retainer means.

4,696,448

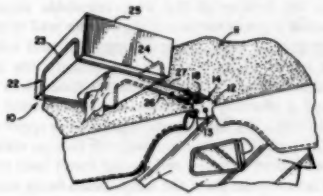
TISSUE BOX HOLDER

Abolfazl Mazloom; Mazloom, Ahmad; Manoochehr Mazloom, and Iraj Mazloom, all of 900 S. Kilbourne Rd., Columbia, S.C. 29205

Filed Dec. 2, 1985, Ser. No. 806,980

Int. Cl.[4] A47K *1/08*

U.S. Cl. 248—311.2 **3 Claims**



1. An apparatus for mounting, in an inverted position, a standard tissue box to a visor holder in the middle of the front windshield of an automobile, which apparatus comprises:

a bracket, having bottom ends for attaching said bracket beneath said visor holder and having top ends pressed downwardly to form half circle ends, each half circle end having a hole centered therein, and

a tube mounted between said half circle ends of said bracket to serve as a retainer, and

a wire holder, rectangular in shape, having an upwardly extending portion at the front and a downwardly extending portion at the back of said wire holder, to slidably engage the sides of said standard tissue box and having extending arms whose extreme ends are bent inwardly in the horizontal plane at a 90 degree angle and repectively pass through the centered holes of said opposing half circle ends and rest well within the opposing ends of said tube, and

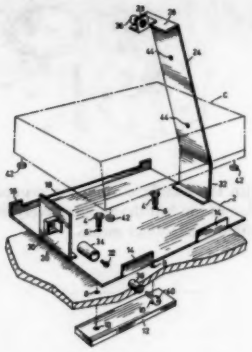
two coil springs, each coil spring wrapped around the opposite ends of said tube and each coil spring having an inside end, to engage the underside of said bracket, and having an outside end bent outwardly in the horizontal plane at a 90 degree angle, to form a hook, under tension, beneath and partially encircling one of said extending arms of said wire holder.

4,696,449

SECURITY DEVICE FOR ELECTRONIC EQUIPMENT

Kenneth Woo, Toronto, and Z. Mamak, Kettleby, both of Canada, assignors to The Board of Governors of Ryerson Polytechnical Institute, Toronto, Canada

Filed Nov. 7, 1985, Ser. No. 795,840
Int. Cl.[4] E05B *73/00*
U.S. Cl. 248—553 **5 Claims**



1. A security device for preventing unauthorized removal of a computer or peripheral unit, comprising a tray having a bottom wall with an upper surface of a size to provide distributed support to the base of a single unit to be protected; upstanding flanges at front and rear edges of the bottom wall of the tray, said flanges being located to prevent substantial forward or rearward movement of the unit to be protected when standing on the bottom of the tray; releasable securement means to secure a lower surface of the bottom wall of the tray in tight engagement with a support member, said releasable securement means comprising a plate beneath the support member and extending in a plane parallel to the bottom wall of the tray, and a plurality of screws having threaded shanks extending downwardly from heads engaging the upper surface of the bottom wall of the tray, through the bottom wall of the tray and the support member, and having lower ends received in threaded bores in the plate, the screw heads being accessible only from the upper surface of the tray; side plates extending upwardly from the lateral edges of the tray such as to flank closely portions of the end surfaces of the unit to be protected which are not required for user access or ventilation; a crossbar hinged to one of said side plates and movable to an operative position extending between the side plates closely adjacent a zone extending laterally across a full width of an upper surface of the unit which is not required for user access or maintenance; and means releasably locking said crossbar in said operative position, with the side plates supporting the crossbar to form with the bottom wall of the tray a releasable girdle having an internal perimeter not substantially greater than the external perimeter of the unit in the plane of the girdle, whereby the girdle embraces the unit sufficiently closely to prevent disengagement of the latter from the upstanding flanges on the tray.

4,696,450

FAN MOTOR ASSEMBLY SUPPORT FRAME

Kuo C. Huang, No. 17, Hsin Ren Road, An-Ping District, Tainan, 000

Filed Apr. 4, 1986, Ser. No. 848,266
Int. Cl.[4] F16M *1/00*
U.S. Cl. 248—661 **11 Claims**

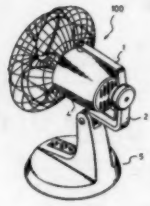
1. A fan assembly, comprising

a fan,

motor means coupled to said fan for rotating said fan with respect to a first fan axis of rotation,

a motor housing in which said motor means are housed,

primary frame means coupled to said motor housing for permitting pivotal movement of said motor housing and primary frame means with respect to each other around a second axis which is substantially perpendicular to said first fan axis of rotation,



secondary frame means coupled to said primary frame means for permitting pivotal movement of said primary frame means and secondary frame means with respect to each other around a third axis which lies substantially in the same plane as and which is substantially perpendicular to said second axis, and

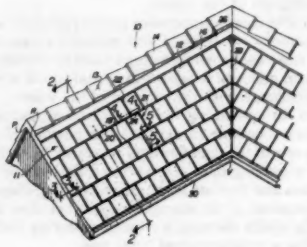
a base on which said secondary frame means are mounted.

4,696,451

GRID SYSTEM AND METHOD FOR CAST FORMING MONOLITHIC CONCRETE ROOF COVERING

Peter W. Mansfield, 511 59th St., Holmes Beach, Fla. 33510

Continuation-in-part of Ser. No. 749,391, Jun. 27, 1985, Pat. No. 4,624,082. This application Nov. 24, 1986, Ser. No. 934,946
Int. Cl.[4] E04G *9/08, 9/10*; E04B *7/02*
U.S. Cl. 249—16 **12 Claims**



2. A reusable grid system for cast forming a monolithic roof covering of concrete or other like pourable, curable material atop a sloped roof, the cured roof covering having an exposed finished surface and having the stepped, segmented appearance of a conventional tile roof, said grid system comprising:

a plurality of elongated dam bars placeable parallel and spaced apart horizontally atop the roof;

a plurality of elongated spacer bars releasably and supportively connectable transversly and spaced apart between each two adjacent said horizontally disposed dam bars;

means for supportively spacing the bottom edge of each said dam bar above the roof and forming a flow slot for the pourable concrete;

the finished concrete surface formed by the plurality of planes each defined by the top edge of each particular said horizontally disposed dam bar and the top edges of said transversly disposed, spacer bars;

each of said planes generally parallel and offset in step fashion one to another;

the bottom edge of each said transversly disposed spacer bar spaced above the roof so as to form recess lines in the finished surface of the roof covering.

4,696,452

TRIP THROTTLE VALVE

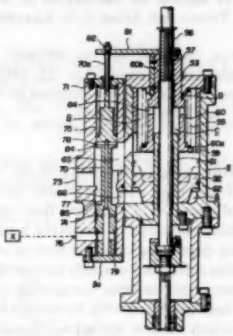
Teiji Miyagawa; Yoshio Iwamura, and Masao Hayakawa, all of Kanagawa, Japan, assignors to Ebara Corporation, Tokyo, Japan

Continuation of Ser. No. 573,378, Jan. 24, 1984, abandoned. This application Feb. 24, 1986, Ser. No. 834,103

Claims priority, application Japan, Jan. 28, 1983, 58-9970[U]; Jan. 28, 1983, 58-9971[U]; Jan. 28, 1983, 58-9972[U]

Int. Cl.[4] F16K *31/143*

U.S. Cl. 251—25 **4 Claims**



1. A trip throttle valve operable under hydraulic pressure comprising:

a main passage for passing fluid therethrough and having a valve body and a valve seat therein;

a valve stem secured to said valve body at one end and arranged to close and open said main passage when said stem is moved in its axial direction;

a hydraulic portion including a piston, a sleeve and a cylinder disposed around an end portion of said stem opposite said valve body, both said piston and said sleeve being movable along an axial direction of said stem, said stem, having a male thread around said end portion which is threadably engaged with said sleeve, which has a compatible female thread, so that the rotation of said stem will cause relative axial movements therebetween, a compression spring located in said cylinder wherein said sleeve together with stem are urged by said compression spring in a direction to close said main passage, a stopper positioned in said cylinder wherein said piston is urged towards said sleeve when hydraulic pressure is applied through an inlet port of said hydraulic portion, and is arrested at a terminal position within said cylinder by said stopper, said piston restricting movement of said sleeve when said sleeve abuts against said piston arrested at said terminal position under hydraulic pressure and thereafter allowing axial movement of said stem upon rotation of said stem;

a by-passing passage for the hydraulic liquid to discharge said liquid supply through said inlet port outwardly from said outlet port of said hydraulic portion except in a case when said pistion is in said arrested terminal position, said inlet and said outlet port being arranged to discharge liquid from said hydraulic portion when the supply of the hydraulic liquid to said hydraulic portion is stopped so as to cause sudden movement of said sleeve under biasing of said compression spring so as to instantly close said main passage;

closing means for closing said by-passing passage;

manipulating means for rotating said valve stem, said piston being disconnected from said sleeve and said stem and wherein a movable stroke of said piston is not greater than a movable distance of said sleeve, so that axial movement of said stem by rotation thereof causes said sleeve to move axially so as to separate said sleeve from said piston and said axial movement of said stem is interrelated with said closing means so as to close said by-passing passage only after one axial end of said sleeve adjacent said piston clears said stopper whereby said piston is prevented from causing the movement of said sleeve while being arrested by said stopper.

4,696,453

COUPLING DEVICE FOR SUBMARINE PIPELINE SYSTEM

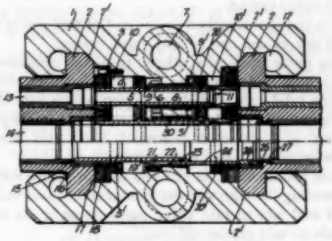
Edgar Furuholt, Trondheim, and Anders M. Liaaen, Alesund, both of Norway, assignors to Den norske stats oljeselskap a.s. and Liaaen Industrier A/S, both of, Norway

Filed Apr. 15, 1986, Ser. No. 852,347

Claims priority, application Norway, Apr. 19, 1985, 851569

Int. Cl.[4] F16L *37/28*

U.S. Cl. 251—149.6 **8 Claims**



1. A releasable coupling unit for a subsea pipeline system, said coupling unit adapted for joining adjacent ends of two adjacent pipeline sectons of said subsea Pipeline system, each adjacent end of said adjacent pipeline sections having an end flange and each said adjacent pipeline sections having at least one conduit running therethrough, said coupling unit comprising:

(a) a casing having two through running grooves, one groove positioned at one end of said casing, the other groove positioned at the other end of said casing, each said groove adapted to fit one end flange;

(b) prestressing means for releasably locking said end flanges when said end flanges are in said through running grooves, said prestressing means positioned adjacent to said through running grooves in said casing;

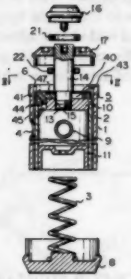
(c) axially displaceable connecting tubes mounted in said casing for joining said conduit of said adjacent pipeline sections when said end flanges are positioned in said through running grooves;

(d) locking device mounted in said casing for releasably locking said connecting tubes in place when said connecting tubes have been axially displaced thereby joining the conduit of adjacent pipeline sections and coupling said adjacent pipeline sections.

4,696,454
VALVE SHIFTING MECHANISM FOR A BRASS INSTRUMENT

Shinji Hamanaga, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Jun. 24, 1986, Ser. No. 877,894
Claims priority, application Japan, Jun. 26, 1985, 60-139899
Int. Cl.[4] F16K *3/314, 3/315;* G10D *9/04*
U.S. Cl. 251—321 **4 Claims**



1. A valve shifting mechanism for a brass instrument, said mechanism comprising:

a generally cylindrical tubular valve casing closed at both ends and provided, in its inner face, with a longitudinal groove;

a generally cylindrical piston tube coaxial with and slidably accommodated in said valve casing;

means fur urging said piston tube towards one closed end of said valve casing;

a piston rod seat attached to one end of said piston tube near said one closed end of said valve casing;

a valve guide made of synthetic resin and provided with an elongated slot extending in the radial direction of said piston tube and a radial projection which extends along a longitudinal center axis of said slot, said radial projection being in slidable engagement with said longitudinal groove in said valve casing; and

a piston rod attached at one end to said piston rod seat and extending through said one closed end of said valve casing and said slot in said valve guide so as to fix said valve guide to said piston rod seat.

4,696,455
ZIRCON AND MGO PREHEATABLE INSULATING REFRACTORY LINERS AND METHODS OF USE THEREOF

Howard B. Johnson, Cincinnati, Ohio, assignor to Consolidated Ceramic Products, Inc., Blanchester, Ohio

Filed Oct. 30, 1984, Ser. No. 666,492
Int. Cl.[4] C21C *5/44*
U.S. Cl. 266—44 **29 Claims**

1. A preheatable molded refractory insulating liner structure prior to preheating of predetermined shape having insulating porosity for temporarily lining a casting vessel and for developing sufficient hot strength to maintain the integrity of the structure at vessel preheat and metal casting temperatures which are in the range of about 1900° F. to about 3000° F. during its use as a liner in a casting vessel, comprising

a molded uniform mixture having a substantial insulating porosity on the order of about 50% prior to preheating containing a particulate refractory component in an amount of about 75% to about 98.5% by weight of said preheatable liner structure of a mixture of zircon and MgO refractory grain wherein said zircon and MgO refractory grain are in a ratio of about 1:1.5 to about 1:24, respectively, and

a binder for said component and inorganic fibrous material in sufficient amounts to maintain the predetermined shape of insulating porosity at least prior to the preheat temperatures wherein said zircon and MgO refractory grain are of a particle size in said preheatable liner structure to facilitate the formation of fosterite bonding which results in increased hot strength with substantial maintenance of insulating porosity and shape without substantial shrinkage at both the vessel preheat temperatures of about 1900° F. to about 2400° F. and higher metal casting temperatures when said preheatable liner structure is used as a liner in a casting vessel and heated for a sufficient period of time.

4,696,456
METHOD OF IMPROVING PERMEABILITY OF METALLURGICAL VESSELS, AND MATERIAL FOR IMPLEMENTING THE SAME

Guy Denier, Metz, France, and Romain Henrion, Esch, Luxembourg, assignors to Institut de Recherches de la Siderurgie Francaise, Metz, France and Arbed S/A, Luxembourg, Luxembourg

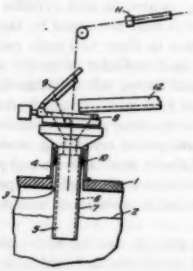
Filed Apr. 20, 1983, Ser. No. 486,845
Claims priority, application France, Apr. 22, 1982, 82 07117
The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.
Int. Cl.[4] C21C *5/44*
U.S. Cl. 266—44 **3 Claims**

1. A method of improving permeability of the bottom of a metallurgical vessel provided with permeable refractory elements for controlled injection of a stirring fluid into a molten metal bath, comprising the steps of emptying a metallurgical vessel of its contents; depositing onto the bottom of the vessel a hydraulic magnesian refractory castable compatible with the material of the bottom, this castable comprising a content of water substantially between 8 and 10% by weight to provide a sufficient fluidity which insures spreading thereof over the bottom of the vessel and leaving the castable to dry and set, while maintaining in the permeable refractory elements a sufficient pressure to insure a permanent flow of the stirring fluid approximately 30 m^3/h per refractory element.

4,696,457
MEANS FOR CHARGING LIQUID SLAG TO A CLOSED SMELTING FURNACE

Jan A. J. Aune, Langhus, and Knut K. Evensen, Andebu, both of Norway, assignors to Elkem a/s, Norway

Division of Ser. No. 662,996, Oct. 19, 1984, Pat. No. 4,593,886. This application Mar. 10, 1986, Ser. No. 837,837
Claims priority, application Norway, Nov. 4, 1983, 834023
Int. Cl.[4] C21C *7/10*
U.S. Cl. 266—207 **16 Claims**



1. An apparatus for charging liquid slag to a roofed smelting furnace containing slag and a furnace gas comprising:

(a) a movable tube member for positioning in the roof, said tube member having an upper end which will be posi-

tioned above the roof and a lower end which will be positioned below the roof;

(b) a gas-tight lid member for closing the upper end of said tube member which will thereby prevent furnace gas from escaping through said tube member; and

(c) means for moving said tube member between a first position where the lower end of said tube member will be below the slag level and a second position where the lower end of said tube member will be above the slag level thereby allowing liquid slag to be charged to said furnace and preventing furnace gas from escaping from said furnace when said apparatus is positioned in the roof and said tube member is in said first position.

4,696,458

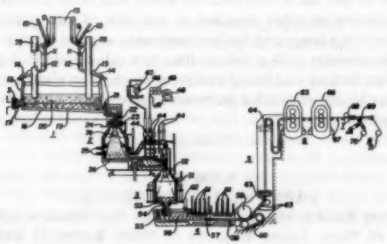
METHOD AND PLANT FOR FULLY CONTINUOUS PRODUCTION OF STEEL STRIP FROM ORE

Semyon E. Royzman, Mt. Lebanon Township, Allegheny County, Pa., assignor to Blaw Knox Corporation, Pittsburgh, Pa.

Division of Ser. No. 819,501, Jan. 15, 1986, Pat. No. 4,664,701. This application Sep. 22, 1986, Ser. No. 909,599

Int. Cl.[4] C21C *1/00*

U.S. Cl. 266—212 **4 Claims**



1. Apparatus for continuous production of steel strip from ferrous ore which comprises

(1) an upright metallic ore reducing furnace having a hearth at its bottom, ferrous ore injection means, oxygen injection means and coal injection means, all positioned above the hearth, a slag tapping port, and a hot metal discharge port at about the hearth level,

(2) a metal refining furnace connected to the metal discharge port of the metallic ore reducing furnace by a closed passage and intermediate device for introduction of hot metal at the top of the metal refining furnace, a hearth at the bottom of the furnace, oxygen injection means and limestone injection means positioned in the metal refining furnace for injection of oxygen and limestone into the metal as it descends through the furnace to the hearth, an outlet of controlled height from the hearth leading to an enclosed porous floor, inert gas injecting means connected to the porous floor, an enclosed deep settle bath section beyond the porous floor, flux and alloy injecting means adjacent the settle bath section, and metal and slag outlet from the settle bath,

(3) a degassing chamber connected by a closed passage to the metal outlet from the settle bath section, and a metal outlet from the bottom of the degassing chamber, and

(4) continuous casting means positioned to receive metal from the metal outlet of the degassing chamber, and having an outlet for discharge of continuously cast metal.

4,696,459

PLASTIC LEAF SPRING WITH AT LEAST ONE SPRING-EYE BODY OR SPRING-EYE SECTION

Herbert Woltron, Moedling, and Christian Huber, Eisenstadt, both of Austria, assignors to Isoport Verbundbauteile Ges. m.b.H., Austria

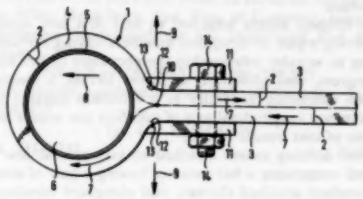
PCT No. PCT/EP85/00075, § 371 Date Oct. 16, 1985, § 102(e) Date Oct. 16, 1985, PCT Pub. No. WO85/03988, PCT Pub. Date Sep. 12, 1985

PCT Filed Mar. 1, 1985, Ser. No. 793,694

Claims priority, application Australia, Mar. 2, 1984, 711/84

Int. Cl.[4] B60G *11/12*; F16F *1/28*

U.S. Cl. 267—36.1 **8 Claims**



1. A plastic leaf spring with at least one spring-eye section of fiber-reinforced plastic having a spring-eye opening and being arranged at one of the spring ends, which comprises a layer (2,16,29) of essentially constant thickness, with a center section (4,18,31) looping the spring-eye opening (6) and two connecting sections (3,17,32) appropriately essentially parallel to each other, with the latter appropriately forming at least part of the spring end, and with the outer surface of the layer (2,16,29) forming a hollow groove (13,24,33) at least at one transition between its center section (4,18,31) and the connecting section (3,17,32), wherein at least at one of said spring-eye sections two reinforcing elements (11,22,34) made of steel and separated from each other are provided, which outwardly adjoin these connecting section (3,17,32) under pressure, and of which at least one thereby having a rounded edge with which it touches the layer surface at the said hollow groove (13,24,33), and which are connected to each other in a form locking manner.

4,696,460

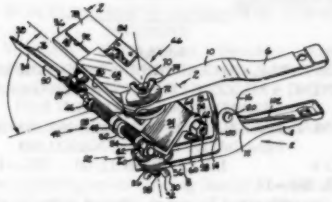
CLAMPING APPARATUS

Eugene P. Genereaux, 7837 S. Forest St., Littleton, Colo. 80122; Samuel M. Jameson, 834 S. Tejon St., and Timothy K. Brooks, 852 S. Raritan St., both of Denver, Colo. 80223

Filed Jul. 11, 1986, Ser. No. 884,484

Int. Cl.[4] B23Q *1/04*

U.S. Cl. 269—6 **20 Claims**



1. Clamping apparatus particularly useful in holding two workpieces of different thicknesses clamped together comprising:

a pair of handle means;

a first jaw means connected to one of said pair of handle means so as to have a common longitudinal axis therewith;

second jaw means connected to the other of said pair of

handle means so as to have a common longitudinal axis therewith;

first pivot means located between said pair of handle means and said first and second jaw means for pivotally connecting said pair of handle means and said first and second jaw means for pivotal movement about a first pivot axis extending transversely to said common longitudinal axes of said pair of handle means and said first and second jaw means to permit movement of said first and second jaw means toward and away from each other and vary the angular relationship between said common longitudinal axis of said first jaw means and said one of said pair of handle means and said common longitudinal axis of said second jaw means and said other of said pair of handle means;

first holding means attached to said first jaw means and having a pair of elongated members having surfaces having an angular relationship therebetween of less than 180 degrees, said elongated members having a longitudinal axis extending generally in a direction parallel to said common longitudinal axis of said first jaw means and said one of said handle means;

second holding means attached to said second jaw means and comprising a bar member having a pair of elongated members attached thereto, said elongated members having surfaces and a longitudinal axis extending generally in the same direction as said longitudinal axis of said elongated members of said first holding means;

said surfaces of said elongated members of said second holding means facing said surfaces of said elongated members of said first holding means for holding at least two workpieces therebetween;

second pivot means connecting a portion of said second jaw means to said bar member for pivotal movement of said second holding means about a second pivot axis transverse to said longitudinal axes of said first and second holding means;

said pivot means permitting movement of said bar member relative to said portion of said second jaw means so that said longitudinal axis of said second holding means is generally parallel to said longitudinal axis of said elongated members of said first holding means when said common longitudinal axis of said second jaw means and said other of said pair of handle means is not parallel to said common axis of said first jaw means and said one of said pair of handle means;

slidable means mounting said bar member on said second pivot means for permitting linear sliding movement of said bar member in either direction along said second pivot means so that workpieces of different thicknesses may be held together in clamped relationship; and

means for applying a force on said first and second jaw means to move said first and second jaw means together so that said first and second holding means will hold said workpieces of different thicknesses in said abutting angular relationship.

4,696,461

PORTABLE, COLLAPSIBLE STAND FOR USE IN CLEANING A MUZZLE LOADING RIFLE OR A MUZZLE LOADING SHOTGUN

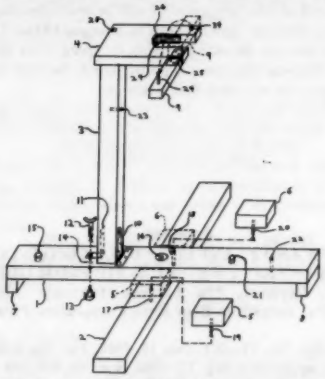
Roger M. Zelinski, R.D. #1, Little Falls, N.Y. 13365

Filed Jul. 19, 1984, Ser. No. 632,609

Int. Cl.[4] B25B *11/00*

U.S. Cl. 269—16 **1 Claim**

1. A portable stand for use in cleaning thebarrel of a muzzle loading rifle or a muzzle loading shotgun comprising a base which is of adequate dimensions to provide substantial stability to said stand and which is formed by two members which pivot about a central axis such that when in use, said members are at approximate right angles with one another and in storage, said members are approximately parallel with one another; means adapted to engage said membes to lock them at substantially right angles with one another and to provide a larger support surface for supporting a bucket used in cleaning the barrel; an upright member attached to said base via hinged means such that when in use, said upright member is approximately perpendicular to said base and ins torage, said upright member folds to approximately lie along side said base; and a barrel receiving mechanism attached to said upright member wherein said barrel receiving mechanism comprises a generally U-shaped member and a latch which closes off the open end of



said U-shaped member, said latch virturally insuring that the barrel cannot be forced from said barrel receiving mechanism except by the use of unwarranted force, said latch comprising an elongated member attached to one side of said U-shaped member via a hinge and further containing a barrel retainer pin which coincides with a hole on the other side of said U-shaped member; further said barrel receiving mechanism also contains another U-shaped slot for purposes of receiving a barrel cleaning rod.

4,696,462

PAPER SUPPLYING DEVICE

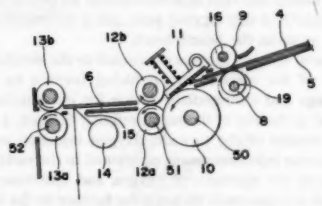
Hironori Tanaka; Masafumi Matsumoto, and Matahira Kotani, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 24, 1985, Ser. No. 790,962

Claims priority, application Japan, Oct. 27, 1984, 59-226226; Oct. 27, 1984, 59-226227

Int. Cl.[4] B65H *3/06*

U.S. Cl. 271—10 **5 Claims**



1. A paper supplying device which comprises:

first feed rollers eccentrically mounted on a horizontal rotational shaft, having convex feed surfaces whereby said feed rollers are capable of coming in contact with a first surface of a paper to be fed;

an urging means disposed so as to face said feed surfaces of said feed rollers, for urging said paper toward said feed rollers while contacting the other surface of said paper;

an interrupting means arranged at the downstream side of said first feed rollers with respect to a feeding direction of said paper, for interrupting the movement of remaining

sheets of paper other than said paper in contact with said convex feed surfaces of said first feed rollers;

second feed means arranged at the downstream side of said first feed rollers with respect to said feeding direction of said paper, for feeding said paper in contact with said feed surfaces, according to an angular displacement of said first feed rollers; and

a transport means arranged at a downstream side of said second feed means with respect to the feeding direction of said paper.

4,696,463

AUTOMATIC ORIGINAL SHEET FEEDING APPARATUS

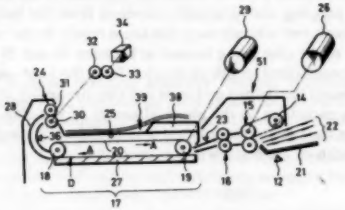
Yukitaka Nakazato; Kenji Hashimoto, both of Tokyo, and Takashi Taruki, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,492

Claims priority, application Japan, Mar. 27, 1985, 60-43247[U]

Int. Cl.⁴ B65H *29/68*

U.S. Cl. 271—176 **4 Claims**



1. An automatic original sheet feeding apparatus for carrying original sheets mounted on an original sheet mounting table to a predetermined work position and ejecting them in succession by an ejecting roller from said predetermined work position to an original sheet receiver such that the ejected sheets are approximately horizontal on said receiver comprising:

an original sheet detecting means disposed in an original sheet carrying passage between said work position and said ejecting roller for detecting said original sheets;

a brake means capable of applying a braking force to said ejecting roller to gradually reduce the rotation speed of said ejecting roller;

a control means responsive to an output information from said original sheet detecting means for actuating said brake means; and

wherein after an original sheet has been engaged by said ejecting roller, said ejecting roller is braked gradually to finally be stopped by said brake means, while said original sheet is being ejected thereby, to thereby eject said original sheets onto a region in the vicinity of said ejection roller without substantial inertia.

4,696,464

METHOD OF AND AN APPARATUS FOR UNITING AT LEAST TWO STREAMS OF SHINGLED LAID OUT PRODUCTS, PARTICULARLY FOLDED PAPER PRODUCTS

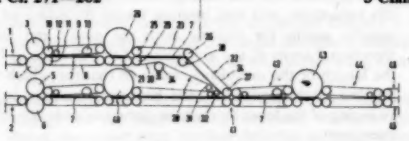
Hagen Gämmerler, Ichoring 44, D-8021 Icking, Fed. Rep. of Germany

Filed Jan. 28, 1986, Ser. No. 823,307

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 3502896

Int. Cl.⁴ B65H *29/66*; B65G *47/26*

U.S. Cl. 271—202 **3 Claims**



1. A method of uniting at least two streams of shingled paper products and the like, comprising the steps of passing a first stream of shingled products along a moving conveyor; passing a second stream of shingled products along a second conveyor at a higher elevation than said first conveyor; synchronizing the movement of the first product stream with the movement of the second product stream; merging the second stream of shingled products with the first stream of shingled products by ejecting the second stream from the higher elevation second conveyor to the first conveyor; and separating the merged first and second streams into a non-shingled single product stream by drawing out the merged first and second streams.

4,696,465

METHOD AND DEVICE FOR ALIGNING SHEETS

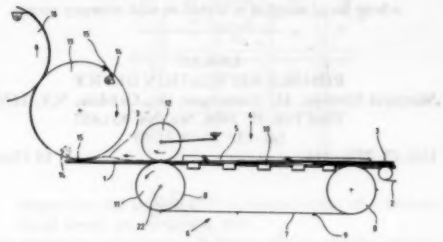
Jeschke Willi, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Nov. 18, 1985, Ser. No. 798,821

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1984, 3442135

Int. Cl.⁴ B65H *9/06*

U.S. Cl. 271—237 **21 Claims**



1. Method of aligning sheets during stream feeding of a multiplicity of sheets over a feed table to a first steadily rotating cylinder of a sheet-processing machine, which comprises in a first feeding stage, conveying the sheets in an imbricated arrangement thereof via the feed table and in a given direction to an alignment region; in a second feeding stage, aligning a lateral and a leading edge of the sheets in the alignment region while the sheets remain in the imbricated arrangement thereof and without interrupting movement of the sheets in the given direction and, in a third feeding stage, accelerating the speed at which the sheets are stream fed to a peripheral speed of a rotating cylinder and feeding the sheets to the first steadily rotating cylinder, while finally aligning the sheets at front markers.

4,696,466

SORTER FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

Kimihito Yamasaki, Ikoma, and Shoichiro Yoshiura, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 4, 1985, Ser. No. 804,474

Claims priority, application Japan, Dec. 5, 1984, 59-258632

Int. Cl.⁴ B65H *39/10*

U.S. Cl. 271—288 **4 Claims**

1. An electrophotographic copying machine comprising:

a plurality of sorter bins for receiving a plurality of copied papers in a sort mode;

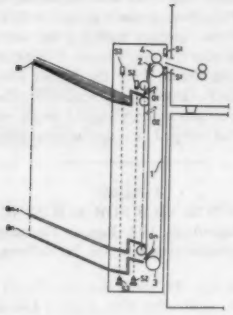
a plurality of sorter guides for sequentially guiding each of the plurality of copied papers into each of said plurality of sorter bins;

sort switch means for interrupting the sort mode and conducting an additional sort mode;

memory means for storing the serial number of a last bin to receive a copied paper in the sort mode;

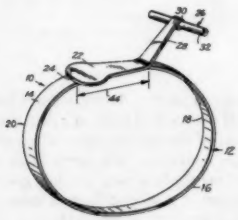
means for detecting the operation of said sort switch means

each time a single one of said plurality of copied papers is received in a respective sorter bin; and



interruption means, responsive to said means for detecting, for sorting one or more copied papers into one or more of said bins having the next higher serial number to said bin whose serial number is sorted in said memory means.

4,696,467
RIDABLE RECREATION DEVICE
Margaret Markow, 141 Connetquot Dr., Oakdale, N.Y. 11769
Filed Feb. 20, 1986, Ser. No. 831,487
Int. Cl.[4] A63B *25/08*
U.S. Cl. 272—114 **16 Claims**



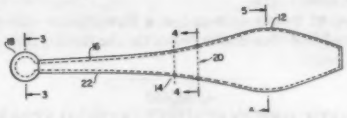
1. A device adapted to be ridden for recreation or exercise, said device having resilient means for propelling said device bouncingly across the riding surface comprising:

a thin solid resilient upright non-metallic annular spring body member having its axis located in the horizontal plane, said spring member having an upper top segment, a lower bottom segment in direct contact with a reacting directly against the surface on which the device is to be ridden, and a pair of opposing substantially ellipsoidal ends, the distance between said ends being less than the distance between said upper and said lower segments, said annular spring having nearly constant flexural and stiffness properties throughout the entire annulus;

handle means to be grasped for support by the rider of said device, said handle means being fixed at least on said upper segment; and

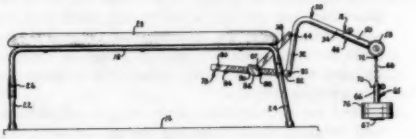
seat means fixed on the radially outer surface of said upper segment proximate said handle means such that said device can be straddled by a rider with his feet in contact with the riding surface and wherein the elasticity of said spring member is such that said rider, by following an operating sequence in which he stores energy in the spring member by flexing his legs to impose his weight thereon and releases said energy to do work by extending his legs, can use the elasticity of said spring member to propel the device and himself bouncingly across said surface.

4,696,468
JUGGLING CLUB
Brian J. Dubé, 24 Washington Sq. N., New York, N.Y. 10011
Filed Jul. 20, 1982, Ser. No. 400,108
Int. Cl.[4] A63B *15/00*
U.S. Cl. 272—124 **7 Claims**



1. A juggling club, comprising: a hollow, unitary, molded plastic body substantially in the configuration of a kingpin in which one end of said club includes a bulged portion and the opposite end thereof includes a knob portion, said bulged portion and said knob portion being integrally connected by an elongated handle portion, where the thickness of the body wall of said juggling club gradually increases from the bulged end to the knob end wherein such thickness results in the center of gravity of the club being located at between 55 and 59 percent of the longitudinal length of the club from the knob end of the club toward the bulged end so as to bring the center of gravity in close proximity to the physical center of the club, further wherein the ratio of the greatest width of the body wall to the least width of the body width is about 1.9.

4,696,469
HAMSTRING MUSCLE EXERCISER
Michael G. Elder, 106 N. Spruce, Goddard, Kans. 67052
Filed Jan. 21, 1986, Ser. No. 820,131
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—134 **9 Claims**



1. Apparatus for exercising the hamstring muscles of the human body, said apparatus comprising:

means for supporting the body in position for articulating the knee joint;

lever means pivotally coupled with the supporting means and including leg engageable means carried by the lever means and adapted to be engaged by the users leg below the knee for swinging of the lever through a vertical arc during said articulation of the knee joint;

means biasing the lever toward the lowermost end of its path of travel, said biasing means being yieldable under the influence of force exerted through the user's leg utilizing hamstring muscles to articulate the knee joint and thereby swing the lever through said arc;

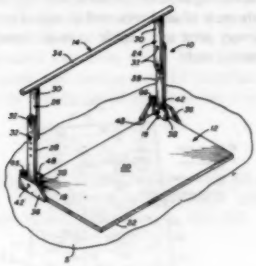
means operably coupled with the support and with the lever respectively for limiting the arc of swing of the lever, said limiting means and said biasing means each being individually adjustable; and said limiting means including an adjustable means for limiting both the upper and lower directional limits of the arc swing of the lever as to limit the length of the exercising stroke to that for which will involve substantially only the hamstring muscles in the swinging of the lever by the user during articulation of the knee joint.

4,696,470

PORTABLE PLATFORM ASSEMBLY FOR DANCERS AND THE LIKE

Edwin H. Fenner, 2909 Princeton, Midland, Tex. 79701

Filed Jan. 13, 1986, Ser. No. 818,598
Int. Cl.[4] A63B 5/02; F16C 11/00; E04G 1/34
U.S. Cl. 272—144 6 Claims



5. A portable platform assembly foldable between a collapsed inoperable position for storage and an extended operable position for supporting a person thereon comprising:

a platform of a generally rectangular shape in plan view and having four corners, said platform in the extended operable position of said assembly defining an upper horizontal surface for supporting a person thereon;

a support base on each of a pair of adjacent corners of said platform including a pair of spaced inner and outer sides extending upwardly from said platform in the extended operable position thereof to provide a pivotal mount;

a pair of generally parallel legs pivotally mounted at their lower ends between the inner and outer sides of the associated support bases and adapted to be pivoted between an extending position at right angles to said platform in said operable position and a generally parallel position with said platform in said collapsed position for storage of said assembly, each support base including a rear abutting support member secured to said platform behind the associated leg and inner side for supporting said leg in its extended position;

releasable retaining means between the associated leg and said rear support member to releasably retain the leg in an extended upright position; and

a rail extending between the upper ends of said parallel legs adapted to be contacted by the body of a person supported on the platform in the operable position of said assembly.

4,696,471

TENNIS PRACTICE AID

Ann M. McGrath, and James A. Douglas, both of 15507 La Madre Selva, P.O. Box 1995, Rancho Santa Fe, Calif. 92067

Filed May 7, 1986, Ser. No. 860,629
Int. Cl.[4] A63B 61/00
U.S. Cl. 273—29 A 19 Claims

1. A device for mounting on an installed tennis net for practice purposes, comprising:

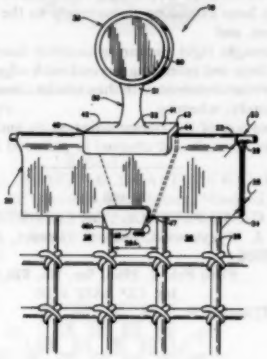
a target member defining a silhouette having a size generally on the order of the size of a conventional tennis ball;

a mounting member adapted to be removably secured to a conventional tennis net headband by engagement of just the headband;

connecting means for connecting the target member to the mounting member so that the target member is supported slightly above a headband to which the mounting member is secured;

an upper edge portion of the mounting member adapted to engage the top edge of a conventional tennis net headband, the upper edge portion defining an upper channel having a generally inverted U-shape for placement over the top edge of a headband, the upper channel having a width slightly larger than the thickness of the top edge of a conventional tennis net headband;

a lower edge portion of the mounting member adapted to engage the bottom edge of a convention tennis net headband, the lower edge portion having a length generally no larger than the width of a conventional net opening, the lower edge portion defining a lower channel generally parallel to the upper channel having a generally upright U-shape for placement over the bottom edge of a headband, the lower channel having a channel width slightly



larger than the thickness of the bottom edge of a conventional tennis net headband; and

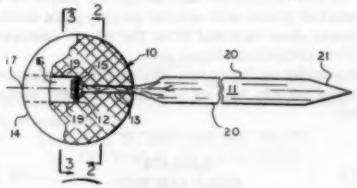
an interconnecting portion of the mounting member extending from the upper edge portion to the lower edge portion, the interconnecting portion having a height between the upper and lower edge portions such that the upper and lower channels are separated by a distance on the general order of the width of a conventional tennis net headband, to enable placement of the upper and lower channels over respective ones of the top and bottom edges of a headband and removably secure the device to the headband with the target member disposed slightly above the headband.

4,696,472

THROWING TOY AND METHOD OF MANUFACTURE

David L. Meyer, 3285 Old Salem Rd., Albany, Oreg. 97321

Filed Nov. 12, 1986, Ser. No. 929,729
Int. Cl.[4] A63B 43/02
U.S. Cl. 273—58 A 5 Claims



1. A throwing toy comprising:

(a) a spherically surfaced ball whose interior is comprised of resilient foam material, and having: (1) a circular cylindrical channel extending from an interior extremity at the center of the ball to the surface of the ball and (2) a slot defined by paired facing flat surfaces joined at straight parallel side extremities, said slot extending from the surface of the ball to the center thereof in communication

with said channel and centered upon a line which when extended is coaxial with the axis of said channel and constitutes a diameter of the ball, the width of said slot, measured between its parallel side extremities being greater than the diameter of said channel, and the depth of said slot, measured between said paired flat surfaces being smaller than the diameter of said channel,

(b) a tether comprising a flat ribbon elongated between anchored and free extremities fabricated of lightweight fibrous material of high tensile strength having a width of ¾ to 2 inches measured between opposed boundary edges and a length of 3 to 5 feet measured between said anchored and free extremities, said anchored extremity having a loop extending transversely to the long axis of the ribbon, and

(c) a straight rigid anchoring member insertively engaging said loop and extending beyond each edge of the ribbon in tranverse abutment with the circular channel at its interior extremity, whereby

(d) a portion of the ribbon adjacent its anchored extremity passes through said channel in gathered form.

4,696,473

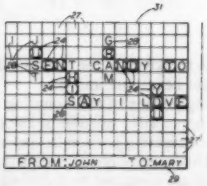
GAME PACKAGE FOR CONFECTIONS

Casmere J. Wyzykowski, 6425 S. Gessner, #2179, Houston, Tex. 77036

Filed Feb. 4, 1986, Ser. No. 826,002

Int. Cl.[4] A63F *9/06*

U.S. Cl. 273—153 R **15 Claims**



7. A game package for packaging and sale of confections comprising;

a plurality of individual edible playing piece confections, some of which display letters of the alphabet,

a playing surface having series of crossing lines defining a grid containing a plurality of similar enclosed spaces slightly larger than said playing piece confections,

some of said spaces displaying letters of the alphabet arranged in a pattern to form a predetermined message or phrase, which is initially unintelligible and unknown to the player, by positioning selected playing pieces in selected unmarked spaces,

a set of instructions for instructing the player to fill the unmarked spaces with selected playing piece confections,

an answer sheet secreted from the player containing the correct completed phrase, and

a container for enclosing said playing piece confections, said playing surface, said set of instructions and said answer sheet.

4,696,474

GOLF COURSE

Harold G. Tegart, 9147 Foothill Blvd., Sunland, Calif. 91040

Continuation-in-part of Ser. No. 431,567, Sep. 30, 1982, Pat. No. 4,572,512. This application Dec. 30, 1985, Ser. No. 814,601

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—176 A **13 Claims**

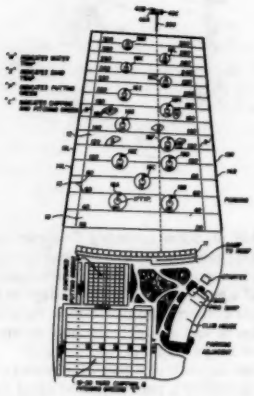
1. A compact golf course with closed circuit television aid to golfers comprising:

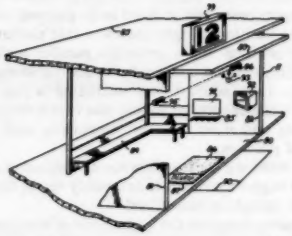
a compact golf course including a plurality of tees directed toward a common fairway area having a number of range markers and target greens for indicating the distances from the tees;

at least one closed circuit television camera located down range of said course and directable toward the fairway and said tees;

a television monitor at each of said tees and coupled to said television camera;

said tees including an illuminatable tee identifier sign associated with each of said tees and directed toward said common fairway area and visible to said closed circuit television camera; and





means at said tees for energizing the illuminatable tee identifier to provide of the player's tee as a player drives a ball therefrom whereby the television camera detects the play actuated illuminated tee identifier and the player can view on a closed circuit TV monitor at his tee the origin of flight of his ball and so follow the flight of the ball to where it rests in relation to the range markers, where with the aid of the closed circuit TV monitor, he can clearly see a closeup of the accurate distance he has hit the ball.

4,696,475

THREAD-WOUND GOLF BALL

Seisuke Tomita, Tokorozawa, and Yoshinori Egashira, Kodaira, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 11, 1985, Ser. No. 774,743

Claims priority, application Japan, Sep. 11, 1984, 59-190080; Nov. 20, 1984, 59-245808

Int. Cl.[4] C08L *7/00, 9/00;* A63B *37/06*

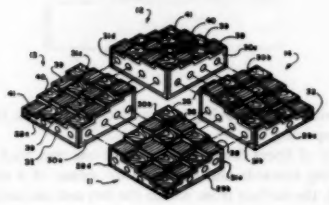
U.S. Cl. 273—227 **15 Claims**

1. A thread-wound golf ball comprising:

a ball core containing rubber material,

a rubber thread layer containing rubber material, and
a cover
wherein at least one of the rubber thread layer or the ball core is a mixture of an isoprene-butadiene random copolymer which contains more than 30 parts by weight of the isoprene-butadiene random copolymer based on 100 parts by weight of the total rubber ingredient and one or more rubber ingredients selected from the group consisting of natural rubber, synthetic isoprene rubber and butadiene rubber, said isoprene-butadiene random copolymer having from 5 to 90% by weight of a butadiene component and from 95 to 10% by weight of an isoprene component, and having a cis-1,4 structure content of more than 80% by weight based on the entire copolymer.

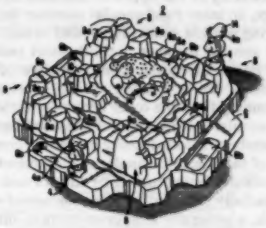
4,696,476
MULTI-STEPPED GAMEBOARD APPARATUS
Gene W. Eplett, 108 Euclid Ave., Ardsley, N.Y. 10502
Filed May 8, 1986, Ser. No. 861,153
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—241 **12 Claims**



1. A three-dimensional game board apparatus comprising at least four sections, each of said sections having at least one surface accommodating a checkerboard design and said surface constructed in seven planar levels having sixteen square steps in a monotonic arrangement, whereby said square steps in each diagonal row from one corner to a second corner of said section are of a similar color, said sections arrangeable n a variety of configurations and nestable forming a rectangular polyhedron, wherein there is one square step at a first planar level, two square steps at a second planar level, three square steps at a third planar level, four square steps at a fourth planar level, three square steps at a fifth planar level, two square steps at a sixth planar level and one square step at a seventh planar level, and said sixteen square steps descend from said first planar level to said seventh planar level.

4,696,477
GAME APPARATUS
Akio Tsuzuki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Japan
Filed Jan. 30, 1986, Ser. No. 824,104
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—241 **7 Claims**

1. An amusement device, comprising:
(a) a base having a path formed thereon;
(b) a plurality of movable means attached to the base and forming a part of the path;
(c) a single operating means connected to the plurality of movable means for randomly moving one of the plurality of the movable means;
(d) actuating means connected to the operating means,
(e) at least one first figure movable about the path; and
(f) at least one loose member capable of being temporarily received by the first figure,
wherein, when the actuating means is actuated, the operating means moves the maovable means with the potential for displacing at least one of the first figure from the



movable means and the at least one loose member from the first figure.

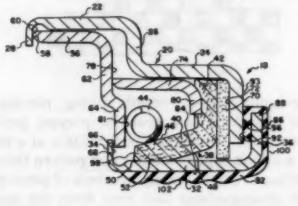
4,696,478
NEUTRAL ZONE, PIECE-CAPTURE GAME
Robert F. Farrell, 25 Churchill Rd., Quincy, Mass. 02169
Filed Nov. 1, 1985, Ser. No. 794,051
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—261 **2 Claims**

1. A piece-capture game board having playing pieces adapted to be placed on said board at playing positions in which only one piece can occupy one position at a time, said board having a matrix-type piece position pattern thereon and at least one defined zone including numbers of piece positions and means for distinguishing said zone from the rest of the board so as to differentiate the spaces within said zone from the spaces outside said zone, said zone the being designated in a manner to indicate that pieces within said zone have their originally defined powers altered such that the manner of play of the game is altered for pieces within said zone, said game board having differently colored squares arranged in a chess or checker-board manner, with adjacent squares having a predetermined light/dark pattern and with selected squares being designated as being within said zone, the squares within said defined zone having the same light/dark pattern as squares adjacent said zone, said zone being cruciform in pattern and having arms extending in different directions, the arms of said cruciform pattern being offset and over-lapping in a central region.

4,696,479
UNITIZED SHAFT SEAL ASSEMBLY
Merrill Karcher, Lake Geneva, Wis., assignor to Triseal Corporation, Woodstock, Ill.
Filed Aug. 26, 1985, Ser. No. 769,177
Int. Cl.[4] F16J *15/32, 15/34, 15/54*
U.S. Cl. 277—37 **8 Claims**

1. A unitized shaft seal assembly comprising an outer rigid annular member including an inner annular ring portion and an outer annular ring portion axially spaced from each other and generally parallel to each other, a first, short, radially inwardly extending flange extending from one edge of said outer annular ring portion, a second, longer radially inwardly extending flange extending from one edge of said inner annular ring portion, and an intermediate flange extending between and integral with the other edges, respectively, of said inner and

outer annular ring portions with said outer annular ring portion extending axially outwardly in one direction from said intermediate flange and said inner annular ring portion extending axially outwardly in the opposite direction from said intermediate flange, an inner rigid annular member including an annular, third ring portion generally parallel to said ring portions of said outer annular member, a third, short radially outwardly extending flange extending from one edge of said third ring portion and a fourth, longer radially outwardly extending flange extending from the other edge of said third ring portion, a flexible annular sealing member disposed between said rigid annular members, a coiled spring extending completely around a portion of said flexible annular sealing member for urging a radially inwardly facing surface or edge of said sealing member against a radially outwardly facing surface of said inner annular member, a generally L in cross-section, intermediate rigid annular member being positioned on one axially facing side of said assembly and including a radially extending annular body having a radially inwardly disposed inner portion which is positioned adjacent to and axially inwardly of said third, short flange of said inner annular member so as to be situated between said spring and said third, short flange so that said third, short flange overlaps said inner portion of said radially extending annular body of said intermediate member and said inner portion having an inner annular edge spaced radially outwardly from said radially outwardly facing surface of said inner annular member, said radially extending annular body being spaced axially inwardly of said first, short flange of said outer annular member and having a radially outwardly extending outer portion positioned parallel to said intermediate flange, said intermediate annular member also including an



outer ring portion which is integral with an outer annular edge of said outer portion of said radially extending annular body, which extends axially outwardly from said annular body and which is positioned adjacent to and generally parallel to said outer annular ring portion of said outer annular member and having an outer edge on one axially facing side of said intermediate member which is disposed adjacent to an inner axially facing surface of said first, short flange of said outer annular member, and said radially inwardly extending inner portion being disposed axially inwardly of said third, short flange of said inner annular member, an annular elastomeric layer of material on a radially inwardly facing surface of said inner annular member and extending axially from a circle generally opposite said third short flange on and along said inwardly facing surface of said inner annular member to the other axially disposed side of said inner annular member, radially outwardly along said fourth, longer flange around an outer end of said fourth flange and radially inwardly along an axially inwardly facing surface of said fourth flange toward the radially outwardly facing surface of said inner annular member, said second longer flange of said outer annular member having an inner annular edge spaced radially outwardly from said radially outwardly facing surface of said inner annular member and being positioned adjacent and axially inwardly of said fourth, longer flange of said inner annular member, said first, short flange being thinner than said second, longer flange and said third, short flange being thinner than said fourth, longer flange, and said layer of elastomeric material having an annular bead integral therewith and located on the axially inwardly facing surface of said fourth, longer flange, radially inwardly of the outer end of said fourth, longer flange, and, extending outwardly of said layer of elastomeric material and axially of the assembly to engage and form a seal with an outer axially facing surface of said second, longer flange of said outer annular member, and the outer radially inwardly facing surface of said layer of elastomeric material providing at least one sealing surface with a shaft on which the seal assembly is mounted.

4,696,480

DEVICE FOR REMOVING DIRT FROM A SURFACE, ESPECIALLY A BRUSH SEALING DEVICE

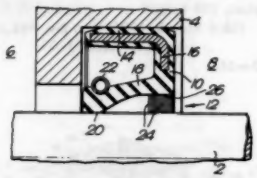
Lennart Jörnhagen, Värnamo, Sweden, assignor to Forsheda AB, Forsheda, Sweden

Filed Oct. 24, 1986, Ser. No. 922,970

Claims priority, application Sweden, Oct. 24, 1985, 8505013; Dec. 18, 1985, 8506002

Int. Cl.[4] F16J *15/447*

U.S. Cl. 277—53 **7 Claims**



1. A device for removing dirt and contaminants from a surface comprising:

a plurality of fibers firmly supported at one end, said fibers extending towards and engaging by means of a contact surface, the surface from which the dirt and contaminants are to be removed, said fibers being adapted to remove the dirt and contaminants while being transitionally moved in relation to this surface, said fibers forming conveyor surfaces extending obliquely with respect to the relative movement between said fibers and the surface, and adapted to remove the dirt and contaminants away from the surface in a direction extending transversely to the direction of the relative movement between said fibers and the surface from which dirt and contaminants are to be removed.

4,696,481

LIQUID COOLED FERROFLUID-TYPE ROTATING SEALS

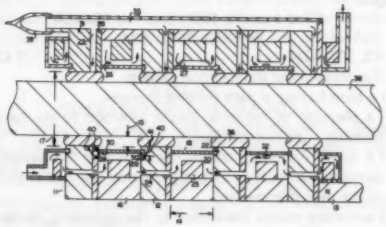
Arthur H. Iversen, 15315 Sobey Rd., Saratoga, Calif. 95070

Continuation of Ser. No. 699,428, Feb. 7, 1985, Pat. No. 4,592,557. This application Apr. 1, 1986, Ser. No. 846,612

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.[4] F16J *15/40, 15/44, 15/54*

U.S. Cl. 277—80 **12 Claims**



1. In a ferrofluid seal apparatus for a rotary shaft, said seal being of the type comprising a magnet adapted to surround

said shaft and a plurality of spaced magnetically permeable pole piece elements magnetically cooperating with said magnet, each of said pole piece elements being disposed to provide a separate magnetic flux path for magnetically capturing ferrofluid in a ferrofluid seal region between a face of said pole piece element and said shaft, the improvement wherein:

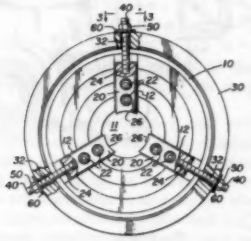
said seal includes means, formed of non-magnetic material in the vicinity of said ferrofluid seal regions, for forming a conduit for liquid coolant between magnetic pole piece in close proximity to said ferrofluid seals; and said magnetic pole pieces include passages therethrough for providing fluid communication between adjacent conduits.

4,696,482

JAW LOCKING MEANS FOR CHUCKS

Lawrence H. Brown, Ambler, Pa., assignor to L. H. Brown, Inc., Ambler, Pa.

Filed Sep. 15, 1986, Ser. No. 907,329
Int. Cl.[4] B23B *31/10*
U.S. Cl. 279—1 SJ **6 Claims**



1. For use with a chuck, such a lathe chuck or the like, having a plurailty of hard jaws guided for sliding movement toward and away from a chuck center and radially to the chuck axis by the jaw setting means of the lathe or the like, and a soft jaw secured on top of each of said hard jaws for conjoint movement therewith as a unit radially to the chuck axis,

a jaw locking means comprising:

a ring means adapted to be arranged to encircle the soft jaws,

said ring means having radially extending holes aligned with the axis of radial movement of said soft jaws,

a plurality of studs, one stud associated with each soft jaw and being secured thereto to extend radially outwardly therefrom,

each stud extending through an associated radial hole in said ring means to provide a threaded portion projecting radially outwardly from the outer surface of said ring means,

and a plurality of nuts, each of said nuts being threadedly engaged on each of said studs at the outwardly projecting portion thereof including means associated with each nut and located on the outer surface of said ring means to provide a scale extending around said nut, including a reference mark for providing an indication of the amount of adjustment of said nut relative to said stud.

4,696,483

VEHICLE SUSPENSION APPARATUS

Shozo Takizawa; Minoru Tatemoto, both of Okazaki; Akio Furumura, Toyota; Tadashi Sugawara, Okazaki; Shigeo Kariya, Nagoya, and Kazuo Hiroshima, Okazaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo K.K., Tokyo, Japan

Filed Jun. 20, 1985, Ser. No. 747,107
Claims priority, application Japan, Jun. 26, 1984, 59-94569[U]
Int. Cl.[4] B60G *17/00*
U.S. Cl. 280—6 H **24 Claims**

1. A vehicle suspension apparatus comprising:

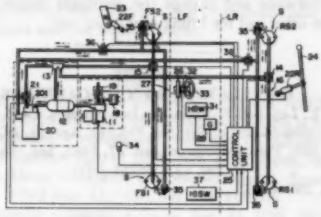
height control fluid spring chambers arranged between respective wheels and a vehicle body;

fluid supply means for supplying a fluid from a fluid source to said fluid spring chambers through fluid supply control valve means;

fluid exhaust means for exhausting the fluid from said fluid spring chambers through fluid exhaust control valve means;

a height sensor for detecting the height of a vehicle from the ground;

height control means for comparing the height detected by said height sensor with a target height and controlling said supply or exhaust control valve means so as to make the detected height equal to the target height;



a high height selection switch;

extra high height control means for opening said supply control valve means for a predetermined period of time so as to increase the detected height by a predetermined value upon the operation of said high height selection switch; and

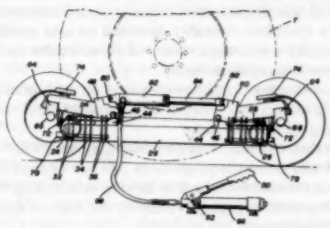
wherein said apparatus further comprises a velocity sensor for detecting a velocity, and said extra high height control means is operated only when a velocity detected by said velocity sensor is lower than a preset velocity.

4,696,484

DOLLY FOR TOWING VEHICLES

Robert Casey, Washington, Ill., assignor to Dover Corporation, Chattanooga, Tenn.

Filed Apr. 28, 1986, Ser. No. 856,202
Int. Cl.[4] B62D *33/08*
U.S. Cl. 280—43.16 **5 Claims**



1. A towing dolly for lifting and supporting a pair of laterally spaced wheels of a disabled vehicle for towing thereof, said dolly comprising a pair of side rails, a pair of spaced apart cross members, mounting means for removably connecting each cross member to both rails for supporting said cross members and for spacing said rails apart laterally, the cross members being adapted to support and cradle the wheels of the disabled vehicle thereon, a pair of pivot blocks for each side rail, journal means for pivotably mounting each pair of pivot blocks at spaced locations on the respective side rail, a rocker arm secured to each pivot block for moving therewith, the rocker arms of each side rail extending away from and in opposite directions to each other, support means for rotatably carrying a dolly support wheel on each rocker arm remote from a respective journal means, abutment means carried by each

pivot block spaced from said journal means facing toward the other pivot block associated with each respective rail, a removable extendible jack means adapted to be placed selectively between and engage the abutment means associated with a respective rail, such that extension of the jack means forces the pair of blocks associated with a rail to pivot relative to the rail to lift the rail relative to the support wheels associated with that rail, and hold-down means for securing said rocker arms to the corresponding side rail when said rail has been raised so that said jack means may be removed from engagement with the abutment means associated with the lifted rail and repositioned between and engage the abutment means associated with the other rail for lifting said other rail.

4,696,485

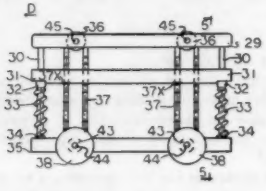
OSCILLATING WEIGHT CARRIERS

Robert E. Lee, 640 S. Main St., Los Angeles, Calif. 90014

Continuation-in-part of Ser. No. 895,511, Apr. 11, 1978, Pat. No. 4,451,055. This application Jun. 27, 1983, Ser. No. 508,028

Int. Cl.[4] B62M *1/00*

U.S. Cl. 280—221 **4 Claims**



1. A weight carrier vehicle propelled by shifting of weight comprising:

a carriage having upper and lower frame members, a plurality of rods connecting said frame members, said lower frame member having axles with ground engaging wheels fixed to said axles;

a footboard slideably mounted on said rods for vertical oscillation;

a plurality of compression springs carried by said rods between said lower frame member and said footboard;

a pair of spindles mounted on said upper frame member with idler sprockets rotatably mounted on said spindles;

a set of drive sprockets mounted on said axles carrying said ground engaging wheels;

a set of one-way clutches mounted on said axles and drivingly connected between said sprockets and said ground engaging wheels; and

a plurality of endless chains engaging said idler sprockets and said drive sprockets with one run of each chain connected to said footboard in driving relationship for driving said ground engaging wheels by the vertical oscillation of said footboard.

4,696,486

REAR STEER ANGLE INDICATOR FOR ARTICULATING VEHICLE

Martin L. Ruhter, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jan. 21, 1986, Ser. No. 821,385

Int. Cl.[4] B60Q *1/00*

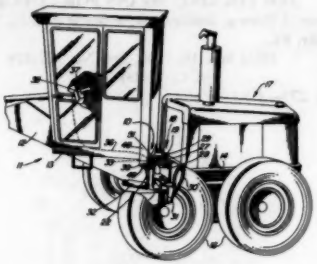
U.S. Cl. 280—400 **5 Claims**

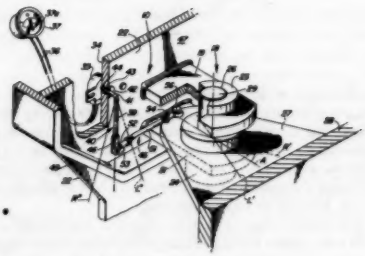
1. In a vehicle having a steerable wheelmounted mainframe and a wheelmounted engine frame articulately mounted to the rear of the mainframe, the articulation joint comprising a forwardly extended, horizontally disposed tongue portion on the engine frame and a rearwardly extended horizontally disposed plate mounted on a vertically disposed plate portion of the mainframe, both plate and tongue portion pivotally connected by a vertically disposed pin, an improved rear steer angle indicator unit comprising:

sensing means capable of converting mechanical motion to electrical signals, said sensing means mounted on the side of said vertically disposed mainframe plate portion opposite the articulation joint;

gauge means electrically connected to said sensing means and capable of indicating the degree and direction of movement of the engine frame relative to the mainframe;

sensing arm means inserted through said vertically disposed mainframe plate portion and connected with said sensing means, said sensing arm means comprising an L-shaped arm the upper portion of which is inserted into said sens-





ing means about a normally horizontal axis, and the lower portion of which depends from the upper portion parallel and closely adjacent a rear face of said vertically disposed mainframe plate portion; and

linkage means connected at one end thereof to the engine frame tongue at a location between said tongue and said plate, and at the other end thereof to said sensing arm means, whereby movement of the tongue relative to said vertically disposed mainframe plate portion results in like amount of movement of said sensing arm means in said sensing means and consequent indication by said gauge means of the degree and direction of movement of the engine frame relative to the mainframe.

4,696,487

SKI WHICH IS STIFF IN TORSION AND RELATIVELY WEAK IN BEAM

Donald A. Girard, P.O. Box 172, Rancho Cordova, Calif. 95670

Filed Oct. 7, 1985, Ser. No. 785,334

Int. Cl.[4] A63C *5/07*

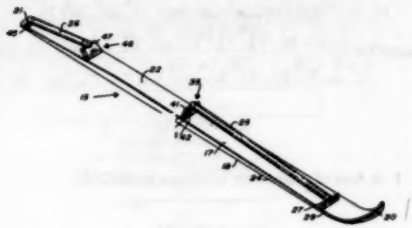
U.S. Cl. 280—602 **18 Claims**

1. A ski that is stiff in torsion and is flexible in the vertical direction, comprising

a ski with a bottom surface and a top surface, a curved-up front end, a rear end, and a ski binding area in between its ends for affixation of a user's ski boot,

a pair of substantially rigid rectilinear members that are stiff in torsion, and

a series of mounting means rigidly secured on said ski defining pivoting means for pivotally mounting said rigid members about two axes transverse to said ski, comprising one pair of mounting means to the rear of said binding area for mounting a rear said rigid member and one pair of mounting means in front of said binding area for mounting a forward said rigid member, said rigid members being



mounted longitudinally of said ski, all the pivoting being about the two axes transverse to the longitudinal axis of said ski,

one said pivoting means of each said two mounts being directly pivoted to its said rigid member about an axis tangential to the longitudinal axis of said ski, the other said pivoting means having an intermediate member pivoted about an axis transverse to said ski and also pivoted about an axis tangential to the longitudinal axis of said ski at a point spaced therefrom to its said rigid member.

4,696,488

SUSPENSION FOR MOTOR VEHICLES

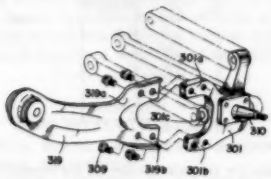
Keiichi Mitobe, and Kanji Kubo, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 24, 1984, Ser. No. 653,644

Claims priority, application Japan, Sep. 22, 1983, 58-175677; Oct. 26, 1983, 58-200365

Int. Cl.[4] B60G *3/00*

U.S. Cl. 280—690 **5 Claims**



1. A suspension system for suspending a wheel on a motor vehicle frame, said suspension system comprising:

(a) trailing arm means extended in the longitudinal direction of the vehicle frame, said trailing arm means having a front portion including an arm means adapted to be pivotally coupled to the vehicle frame and a rear portion, wherein the rear portion of said arm means is bifurcated, having upper and lower projections;

(b) a knuckle means adapted to support the wheel, the front portion of said knuckle means being bifurcated and having upper and lower projections and a boss disposed between said upper and lower projections, wherein the upper projection of said knuckle means is fixed to the upper projection of said arm means and the lower projection of said knuckle means is fixed to the lower projection of said arm means;

(c) an upper link arm extending substantially transverse to the vehicle frame, said upper link arm having a first end adapted to be pivotally coupled to the vehicle frame and a second end pivotally coupled to said knuckle means;

(d) a lower link arm extending substantially transverse to the vehicle frame, said lower link arm having a first end adapted to be pivotally coupled to the vehicle frame and a second end pivotally coupled to said knuckle means, wherein said lower arm is positioned lower than said upper arm;

(e) a compensation link having a first end adapted to be pivotally coupled to the vehicle frame and a second end pivotally coupled to said boss on said knuckle means; and

(f) spring means adapted to be coupled between said trailing arm means and the vehicle frame.

4,696,489

AUTOMOTIVE SUSPENSION SYSTEM WITH VARIABLE DAMPING CHARACTERISTICS

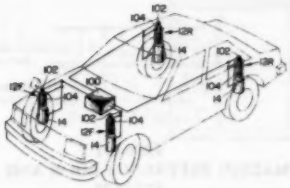
Takeshi Fujishiro, Yokohama; Sadahiro Takahashi, and Takanobu Kaneko, both of Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Jan. 13, 1986, Ser. No. 818,265

Claims priority, application Japan, Jan. 14, 1985, 60-4791

Int. Cl.[4] B60G *17/04*

U.S. Cl. 280—707 **12 Claims**



1. A suspension control system for an automotive vehicle comprising:

a vehicular suspension system with damping characteristics variable at least between a first harder suspension mode and a second softer suspension mode;

a first sensor means for monitoring vertical displacement of a vehicle body within a gravity field and producing a first sensor signal indicative of the vertical speed of said vehicle body;

a second sensor means for monitoring relative distance between the vehicle body and a vehicular wheel assembly and producing a second sensor signal indicative of the relative speed between said vehicle body and said wheel assembly;

a controller responsive to said first and second sensor signals for predicting the effect of damping characteristics of the suspension system from between a first condition in which said damping characteristics of the suspension system act to amplify vehicle body vibrations and a second condition in which damping characteristics of the suspension system act to absorb vehicle body vibrations, said controller causing said vehicular suspension system to assume said second softer suspension mode when said first condition is predicted and to assume said first harder suspension mode when said second condition is predicted.

4,696,490

BOOK POCKET ASSEMBLY AND BLANK THEREFOR

Bernard T. Sendor, Westbury, and Mortimer S. Sendor, Queens Village, both of N.Y., assignors to Sendor Bindery, Inc., New York, N.Y.

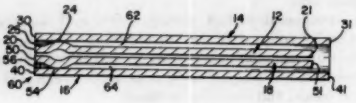
Filed Jul. 3, 1986, Ser. No. 881,641

Int. Cl.[4] B42D *3/18*

U.S. Cl. 281—15 R **17 Claims**

1. A pocket assembly formed from a single sheet of paperboard material for use with a book, said pocket assembly com-

prising at least one pocket, said pocket comprising a support panel and a retaining panel articulated to said support panel along a fold line and disposed in parallel generally face-to-face relationship with said support panel, said pocket further being defined by an elongated embossment unitary with said paperboard material and extending away from said fold line and



extending intermediate said retaining panel and said support panel, said pocket further comprising an adhesive material disposed intermediate said retaining panel and said support panel and substantially adjacent said embossment, said adhesive material securing said retaining panel to said support panel adjacent said embossment, whereby said embossment prevents the spread of the adhesive into the pocket.

4,696,491

INFORMATION REFERENCE BOOK AND INDEXING SYSTEM

Barbara J. Stenger, P.O. Box 403, Brimfield, Ill. 61517

Filed Jun. 19, 1986, Ser. No. 875,947
Int. Cl.[4] B42F *21/00, 19/00, 13/00*
U.S. Cl. 283—37 **11 Claims**

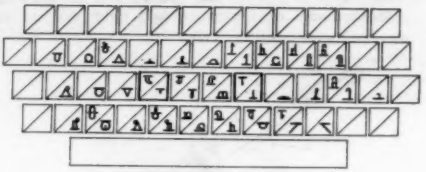
1. An information reference book for storing abstracted material from a larger source in a single depository comprising;
a looseleaf binder;
a plurality of dividers receivable within the binder and having alphabetical tabs of a predetermined relatively small size outwardly extended therefrom, and said dividers providing a plurality of alphabetized abstracting forms receiving spaces therebetween;
an auxiliary divider disposed within the binder and having an elongated tab outwardly extended thereform of a form and size larger than said alphabetical tabs;
a form storage space defined behind said auxiliary divider;
and a supply of unused abstract forms initially temporarily stored in said form storage space behind said auxiliary divider with said unused forms being transferable after use to appropriate ones of said alphabetized spaces in the binder.

4,696,492

SOUNDWRITING—A PHONETIC SCRIPT WITH KEYBOARD

Evelyn L. Hardin, 1625 28th Ave., Meridian, Miss. 39301

Filed Jun. 27, 1985, Ser. No. 749,414
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—45 **3 Claims**



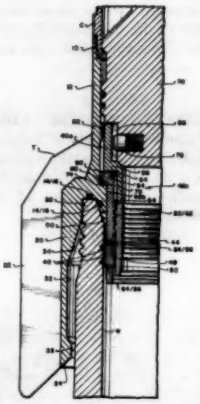
1. A font of characters as shown in FIG. 5.

4,696,493

SUBSEA WELLHEAD TIEBACK SYSTEM

Norman Brammer, Ventura, Calif., assignor to Vetco-Gray Inc., Houston, Tex.

Filed Jun. 11, 1986, Ser. No. 872,794
Int. Cl.[4] F16L *37/08*
U.S. Cl. 285—3 **5 Claims**



1. A conductor tieback connector for connecting a conductor to an internally grooved subsea wellhead comprising;
a tubular body sealably and rigidly connectible to the conductor;
a downwardly opening funnel means with internal bearing surfaces for aligning the connector, said funnel means being connected to said tubular body;
internal threads on said tubular body;
abutting surfaces on the wellhead and said tubular body for abutting when said tubular body is fully engaged within the wellhead; and
lockdown means comprising, a two-piece bushing located within said tubular body, including external threads on one piece of said bushing engagable with said internal threads on said tubular body, locking means on said other piece of said bushing for engaging said wellhead, means for interlocking said one piece with a rotating tool, means for interlocking both pieces together, means internal of said tubular body and engagable with means on said bushing for preventing downward movement of said bushing relative to said tubular body, and means for preventing

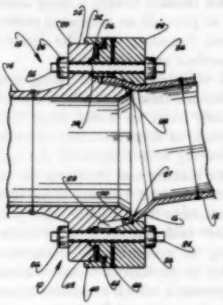
rotation of said one piece and for disconnecting said means for interlocking both pieces together whereby said other piece, upon continued rotation, will urge and lock said locking means in said wellhead grooves.

4,696,494

FLOWLINE ADJUSTABLE JOINT

Thomas R. Schmitz, Katy, and William M. Taylor, Houston, both of Tex., assignors to Cameron Iron Works, Inc., Houston, Tex.

Filed Jun. 5, 1985, Ser. No. 741,269
Int. Cl.[4] F16L *27/06*
U.S. Cl. 285—18 **5 Claims**



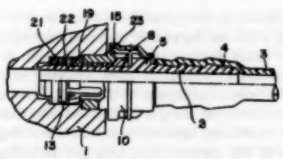
1. An adjustable flowline joint comprising
an arcuate bell flange,
an annular flanged assembly having a flange and a ring secured thereto with facing arcuate surfaces on the flange and the ring,
tension means for securing said flange to said ring,
said arcuate surfaces being contoured to receive said bell flange therebetween,
tensioning of said tension means clamping said bell flange between said arcuate surfaces,
pressure responsive means between said flange and ring, and
means for introducing fluid under pressure to said pressure responsive means to increase the tension on said tension securing means to displace said arcuate surfaces and thereby release said bell flange for angular adjustment by pivoting with respect to said flanged assembly.

4,696,495

PIPE FITTING ASSEMBLY

Patrick R. Oliver, Bristol, Great Britain, assignor to Bendix Limited, Bristol, Great Britain

Filed Aug. 19, 1986, Ser. No. 897,965
Int. Cl.[4] F16L *27/00*
U.S. Cl. 285—86 **9 Claims**



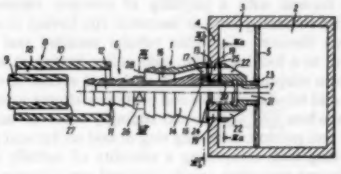
1. A pipe fitting assembly for rotatably securing a pipe in an opening in a housing, said pipe fitting assembly including a first part carried in said opening and a second part connected to said pipe, said first part including a member nonrotatably mounted in said opening and an insert carried by said member, and rotatable with respect thereto, said insert and said member including cooperating means for preventing axial withdrawal of the insert from said member, said insert defining an aperture slidably receiving said second part, first abutment means on said insert cooperating with second abutment means on said second part to oppose withdrawal of said second part from the first part by locking said second part to said insert, said first and second abutment means including releasing means responsive to rotation of said insert relative to said second part to disengage said first and second abutment means to permit withdrawal of said second part from the insert.

4,696,496

SYSTEM FOR PUTTING TWO CONTIGUOUS ENCLOSURES INTO INDIVIDUAL COMMUNICATION WITH THE OUTSIDE

Hubert V. de Guelis, Le Pecq, and Pascal Doute, Verneuil-sur-Seine, both of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Oct. 18, 1985, Ser. No. 789,152
Claims priority, application France, Oct. 31, 1984, 84 16704
Int. Cl.[4] F16L *39/00*
U.S. Cl. 285—137.1 **8 Claims**



1. A system for putting two contiguous enclosures disposed on the same side of a common wall into individual communication with the outside, wherein the system comprises:
both a two-piece coupling part constituted by:
a first tubular end piece suitable for being coupled to a first pipe and provided with a first axially disposed passage in communication with a first opening provided in said common wall, said first end piece having first connecting means and being intended to be mounted on said common wall, on the opposite side to said enclosures; and
a second end piece suitable for being coupled to a second pipe surrounding and enclosing said first pipe in such a manner as to provide an intermediate space between the outside wall of the first pipe and the inside wall of the second pipe, said second end piece being fixed to said first end piece, being coaxial therewith, and being disposed in such a manner as to include at least one second passage which is eccentric relative to said first passage, and suitable for being put into communication with said intermediate space between the pipes and with a second opening provided through said common wall, said second end piece being intended to be mounted on said common wall on the side opposite to said enclosures;
and also a fixing part disposed on the same side as said enclosures and provided with second connecting means for fixing said coupling part by way of said first connecting means to the said common wall, said fixing part including an axial passage opening out into one of said enclosures and intended to be put into communication with said first passage through said first end piece and said first opening through said common wall, together with at least one eccentric passage opening out into the other enclosure and intended to be put into communication with said second passage through said second end piece and said second opening through the common wall of the enclosures.

4,696,497

QUICK CONNECTOR

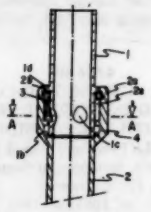
Hermann Schwarzensteiner, D-8447, Windberg, Fed. Rep. of Germany

Filed May 30, 1986, Ser. No. 869,009

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1985, 3525402

Int. Cl.⁴ F16L *37/08*

U.S. Cl. 285—307 **5 Claims**



1. A quick connector for coupling one tubular member having a socket end portion to another tubular member and portion formed with a plurality of concave recesses, said socket end extending from an eccentric rim having at least one projection thereon, said other tubular member end portion extending to a locking collar, said collar having at least one indentation adapted to interlock with said eccentric rim projection, said tubular member end portions defining a gap therebetween when said socket end slidingly receives said other member end portion, a locking ring in said socket end portion, said locking ring comprising a plurality of radially resilient detent fingers extending axially into said gap wherein each of said fingers terminates in a radially inwardly, obliquely angled web movable in the direction of and circumferentially aligned with one of said recesses.

4,696,498

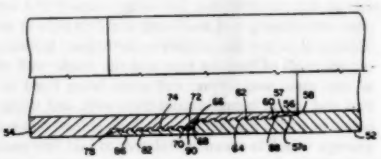
TUBULAR CONNECTION

Kristy L. Church, Houston, Tex., assignor to Quanex Corporation, Houston, Tex.

Filed Oct. 29, 1986, Ser. No. 924,652

Int. Cl.⁴ F16L *25/00*

U.S. Cl. 285—334 **9 Claims**



1. A high tensile strength two step threaded connection for adjacent mating end portions of a pair of plain end, non-upset axially aligned tubular members, said two step connection comprising:

a male tubular member having a tapered threaded end portion and being of uniform inner and outer diameters throughout its length except for said threaded end portion, said end portion defining an annular end shoulder and an outer peripheral surface tapering outwardly from said end shoulder in a generally transverse relation to the end shoulder, said outer peripheral surface being generally smooth directly adjacent said end shoulder to provide a metal-to-metal seal contact area;

a female tubular member having a mating tapered threaded end portion and an inner diameter forming a smooth continuation of the inner diameter of said male tubular member to provide a straight interior bore of a uniform inner diameter, said female tubular member having an annular inner shoulder about its inner periphery and an inner peripheral surface tapering outwardly from said inner shoulder in generally complementary relation to said outer peripheral surface of said male tubular member, said inner peripheral surface being generally smooth directly adjacent said inner shoulder to form a seal contact area for engaging said seal contact area on said male tubular member in a compressible metal-to-metal sealing relation;

the threaded end portion of each of said tubular members having a pair of stepped sets of mating tapered hook threads adjacent the smooth seal contact area thereof with each set of hook threads having a steep taper and a coarse pitch thereby to provide an increased stabbing depth and to prevent cross threading when the connection is assembled with imperfect axial alignment;

said steep taper and coarse pitch being constructed and arranged so that said tubular members are rotated less than around one turn from an initial hand tight plane to a power tight plane at final assembly thereby to minimize galling and scraping action between the tubular members and to facilitate making and breaking the connection;

said smooth metal-to-metal contact areas upon rotation of said tubular members from a hand tight plane to a power tight plane after said contact areas initially engage each other resulting in compressible metal-to-metal sealing contact thereby to provide a metal-to-metal seal against internal fluid pressure which maintains its sealing pressure upon an increase in internal fluid pressure,

said tubular members being constucted and arranged so that said connection after final assembly to said power tight plane will have a tensile yield strength at least equal to the tensile yield strength of the tubular members thereby providing a high strength connection for plain end tubular members.

4,696,499

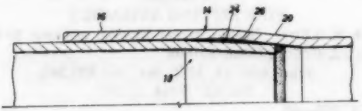
MECHANICAL PIPE JOINT AND METHOD OF FORMING THE SAME

Major G. Butler, Houston, Tex., assignor to Butler Taper Joint, Houston, Tex.

Continuation of Ser. No. 267,841, Jun. 5, 1981, abandoned, which is a continuation-in-part of Ser. No. 162,722, Jun. 25, 1980, abandoned. This application Apr. 29, 1983, Ser. No. 489,832

Int. Cl.⁴ F16L *25/00*

U.S. Cl. 285—234.4 **5 Claims**



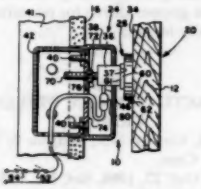
1. A mechanical pipe joint for connecting two pipe sections, comprising a pin on the end of one section and a socket on the end of the other section into which the pin is inserted, said socket including a cylindrical section having an inside diameter less than the outside diameter of the pin to form an interference fit with the pin when the pin is inserted into the socket and an outwardly extending tapered section connecting the cylindrical section to the pipe section, said pin including an inwardly tapered section having an angle of taper less than the angle of taper of the tapered section of the socket to form a substantially closed annular cavity between the tapered section of the socket and a portion of the cylindrical section of the socket in which sealant may be trapped to seal the joint when the tapered section of the pin is moved into position close to the tapered section of the socket.

4,696,500

DOORHOLDER ASSEMBLY FOR A POCKET DOOR

Richard L. Zunkel, 218 Loon Ct., Foster City, Calif. 94404

Filed Jan. 2, 1986, Ser. No. 815,549
Int. Cl.[4] E05C 17/56
U.S. Cl. 292—251.5 3 Claims



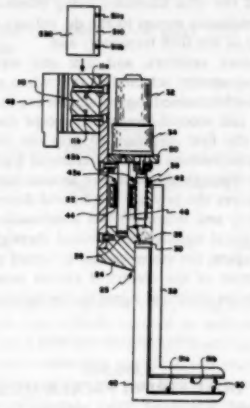
1. A doorholder assembly for use with a pocket door which is biased by a doorcloser from an open position in which the door is located in a pocket in a wall toward a closed position, said doorholder assembly comprising a housing mountable on a vertical surface of the wall inside the pocket, an electromagnet supported by said housing, said electromagnet having an armature engaging surface, an armature mountable on the door to be movable with the door when the door moves from its closed position to its open position into engagement with said armature engaging surface of said electromagnet, adjustable mounting means for mounting said electromagnet to said housing and being adjustable to vary the distance that said armature engaging surface is disposed relative to the surface of the wall on which said housing is to be mounted to enable the visible surface of the door when in its held open position to be aligned coplaner with the wall outside of the pocket and means for selectively energizing said electromagnet to attract said armature to said armature engaging surface to override the biasing force of the doorcloser to hole the door in its open position and de-energizing said electromagnet to release said armature from said armature engaging surface allowing the door to be biased toward its closed position, said armature including an annular metallic member having an annular shoulder thereon, said metallic member being attractable to said armature engaging surface when said electromagnet is energized, an annular mounting member for mounting said metallic member on the door, said annular mounting member having an annular opening disposed therein through which said annular metallic member projects to engage with said armature engaging surface of said electromagnet and an annular shoulder disposed about said annular opening, said annular shoulder on said mounting member having a diameter which is less than the diameter of the annular shoulder on said metallic member to provide an interference fit between said metallic member within said annular opening in said mounting member and limit movement of said metallic member relative to said mounting member, and compressable resilient means disposed between said annular shoulder on said metallic member and said annular shoulder on said mounting member, said annular metallic member being movable toward said annular mounting member when said metallic member is attracted to said armature engaging surface to compress said resilient means between said annular shoulder located on said metallic member and said annular shoulder located on said mounting member, said resilient means when compressed allowing said metallic member to move relative to said mounting member to compensate for angular misalignment between said metallic member and said armature engaging surface, and wherein said resilient means comprises a resilient ring, said electromagnet when energized establishing vibration therein from the AC current passing therethrough which is transmitted to said metallic member when said metalic member is engaged with said armature engaging surface of said electromagnet, said resilient ring absorbing vibration established upon energization of the electromagnet by AC current and preventing the transmittal of said vibration from the electromagnet and the metallic member, to the mounting ring and the door.

4,696,501

ROBOT GRIPPER

Winston S. Webb, Clearwater, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 30, 1986, Ser. No. 824,049
Int. Cl.[4] B25J 15/02
U.S. Cl. 294—86.4 19 Claims



1. An electronic force-detecting robot gripper for gripping objects comprising:

first and second gripper jaws for gripping objects;

motor means for driving the jaws in a first direction to grip the objects and in a second direction to release the objects;

electrical circuit means supplying an electrical signal to the motor means for driving the jaws in the first direction, the electrical signal varying as a function of the amount of force applied to the objects by the jaws and wherein the electrical circuit means for supplying a signal to the motor means further comprises:

feedback means responsive to a preselected electrical signal for terminating the driving of the jaws in the first direction;

a first driver input coupled to the feedback means;

a second driver input coupled to the feedback means;

a first output connected to a first control line of the motor means;

a second output connected to a second control line of the motor means;

a third output connected to the feedback means;

first, second, third, fourth, fifth, and sixth transistors each having a collector, base, and emitter;

a first amplifier coupled to the first driver input having a noninverting output coupled to the base of the first transistor, and further having an inverting input;

a second amplifier coupled to the second driver input and the noninverting output of the first amplifier, the second amplifier having a noninverting output coupled to the second transistor and an inverting input coupled to the input of the first amplifier;

the collector of the first transistor being connected through a first resistance means to the base of the third transistor, and the emitter of the first transistor being coupled to the base of the fourth transistor;

the collector of the second transistor being connected through a second resistance means to the base of the fifth transistor, and the emitter of the second transistor being connected to the base of the sixth transistor;

the base of the third transistor being connected through a third resistance means to an external dc voltage source, the emitter of the third transistor being connected to the dc voltage source, and the collector of the third transistor being connected to the first output of the electrical circuit means and also to the collector of the sixth transistor;

the collector of the fourth transistor being connected to the collector of the fifth transistor and to the second output of the electrical circuit means, and the emitter of the fourth transistor being connected to the emitter of the sixth amplifier and the third output of the electrical circuit means;

the base of the fifth transistor being connected through a fourth resistance means to the dc voltage source and the collector of the fifth transistor; and

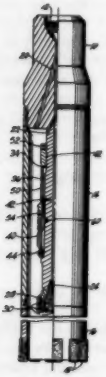
the transistors, resistors, and first and second amplifiers having parameters selected so that when a first combination of predetermined logical signals are received through the first and second inputs, the motor means drives the jaws in the first direction to grip the objects, when a second combination of predetermined logical signals are received through the first and second inputs, the motor means drives the jaws in the second direction to release the object, and when a third combination of predetermined logical signals are received through the first and second inputs, the motor means is turned off, further, the third output of the electrical circuit means carries the motor means electrical signal to the input of the feedback means.

4,696,502

DUAL STRING PACKER MILL

Praful C. Desai, Kingwood, Tex., assignor to Smith International, Newport Beach, Calif.

Filed Aug. 19, 1985, Ser. No. 767,039
Int. Cl.[4] E21B *31/16, 31/20*
U.S. Cl. 294—86.17 **9 Claims**



1. A packer mill comprising:

an annular sleeve;

means on the lower end of the sleeve for milling the periphery of a packer;

an axial mandrel inside the sleeve;

means on the lower end of the mandrel for milling an axial hole into the upper end of a packer at an elevation above the milling of the periphery of the packer;

an axially slidable gripper sleeve on the mandrel including a plurality of longitudinally extending fingers, each of the fingers comprising outwardly facing serrations for gripping the walls of the hole in the packer;

a camming sleeve on the mandrel inside the gripper sleeve for camming the fingers radially outwardly for engaging the walls of the axial hole milled in the packer for supporting the packer;

a release ring around the mandrel engaging an end of the camming sleeve; and

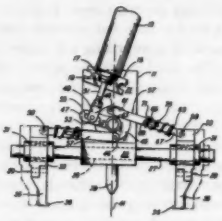
means for bursting the ring in hoop tension upon application of sufficient axial force between the mandrel and camming sleeve for releasing the camming sleeve for axially sliding away from the gripper sleeve for permitting the fingers to collapse radially inwardly.

4,696,503

PNEUMATIC ACTUATED CAM DRIVEN PARALLEL GRIPPER

Zurino P. Collodel, Vernon, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Oct. 27, 1986, Ser. No. 923,225
Int. Cl.[4] B25J *15/08*
U.S. Cl. 294—88 **16 Claims**



1. A parallel gripper comprising:

a supporting bracket for attaching to an end of an arm of a robot or a pick and place system;

at least one shaft secured to said bracket and extending therefrom in two directions;

first and second slides mounted on said shaft for sliding motion thereof;

means to prevent said slides from rotating on said shaft;

first and second fingers detachably connected to said slides whereby said fingers can be readily replaced or interchanged;

actuating means; and

means for coupling said actuating means to said slides such as to move said slides between a first position where said fingers are separated by a first distance and a second position where said fingers are separated by a second distance, said coupling means including first and second arms biasingly coupled to the first and second slides and to said actuating means, said coupling means being compliant so as to permit movement of different fingers between the first and second positions.

4,696,504

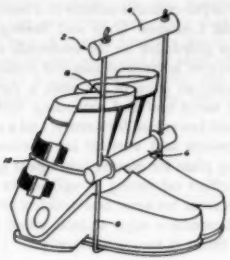
BOOT CARRIER

Roland Q. Roberts, Jr., 4135 Jonquil Cir. North, Palm Beach Gardens, Fla. 33410

Filed Sep. 30, 1986, Ser. No. 913,521
Int. Cl.[4] B65D *63/18*
U.S. Cl. 294—148 **11 Claims**

1. A boot carrier comprising a handle of rigid material with two holes therethrough, one hole near each end of the handle; a solid holding bar of rigid material with two holes through it, one hole near each end of the holding bar; a flexible down cord of nonelastic material, said cord extending through the hole at one end of the handle and then through the hole at one end of the solid holding bar and forming a U-shape for extending around the bottom of a boot and then extending through the other hole in the other end of the solid holding bar and then through the other hole in the other end of the handle; stop means connected to the ends of the down cord to prevent the

down cord from slipping through the holes in the handle, the solid holding bar being slidable up and down on the flexible down cord between the handle and the bottom of the U-shape for placement against a boot shaft; a stretchable retention cord; means connecting each end of said retention cord to the solid



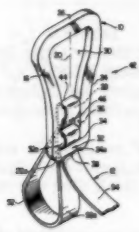
holding bar for extending around the back of a boot shaft, each end of said stretchable retention cord having a loop, said connecting means including each loop being located over said solid holding bar between said two holes in said solid holding bar.

4,696,505

HANDLE AND STRAP APPARATUS FOR HAND-CARRYING ARTICLES

Ralph E. Shadoan, 12537 SE. 38th St., Choctaw, Okla. 73020

Filed Nov. 10, 1986, Ser. No. 928,978
Int. Cl.[4] A45C *13/26*; B65D *71/00*
U.S. Cl. 294—153 **17 Claims**



1. Apparatus for hand-carrying an article, comprising:

a handle for use with an elongated flexible carrying member adapted to be formed into a carrying loop portion wrapped around the article and having an end portion, and a connecting loop portion, said handle having:

an axis;

a grip portion extending generally transversely to said axis and adapted to be grasped by a user of said apparatus; and

connecting means, spaced apart from said grip portion, for anchoring a first portion of said handle to said end portion of said carrying loop and for adjustably connecting a second portion of said handle to said connecting loop portion of said carrying member in a manner such that:

(1) when said grip portion and said carrying loop portion are pulled in opposite directions generally parallel to said axis said connecting loop portion frictionally locks said carrying loop portion to said handle and prevents enlargement of said carrying loop portion, and

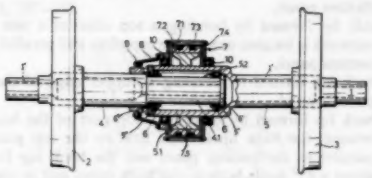
(2) when tension on said carrying loop portion is relaxed it may be selectively lenghtened or shortened to adjustably loosen or tighten said carrying loop about the article, by pulling on a portion of said carrying member to shift the location of said connecting loop portion thereon.

4,696,506

WHEEL SET FOR RAIL VEHICLES

Rolf Leo, Wertingen; Karl-Heinz Meusel, and Alfred Uttner, both of Donauwoerth all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Dec. 31, 1985, Ser. No. 815,399
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1985, 3501488
Int. Cl.[4] B60B *35/14*; B61F *5/38*
U.S. Cl. 295—38 **5 Claims**



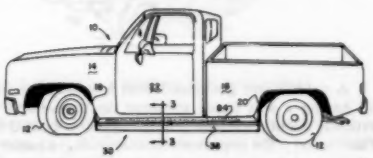
1. A wheel set for rail vehicles, comprising an axle having a longitudinal axis, two wheels secured to said axle, said axle being divided into a first axle section and a second axle section, clutch means interconnecting said first and second axle sections for selectively permitting said first and second axle sections to rotate at different r.p.m.s for permitting a differential r.p.m., one of said axle sections having a hollow end forming a radially outer axle section end, the other of said axle sections having a radially inner axle stub forming a radially inner axle section end fitting into said hollow radially outer axle section end, first bearing means (6) interposed between said hollow radially outer axle section end and said radially inner axle stub for permitting relative rotation while preventing axial movement between said axle sections, said clutch means comprising a radially inner clutch component (7.2) and a radially outer clutch component (7.1), first means (7.5) rigidly securing said radially inner clutch component on said radially outer axle section end, second means for rotatably supporting said radially outer clutch component on said radially outer axle section end and for rigidly connecting said radially outer clutch component to said other axle section outside said radially inner axle stub, whereby both clutch components are mounted on said radially outer axle section end.

4,696,507

RUNNING BOARD AND TOOLBOX

Mark L. Alldredge, 1823 N. University, Lubbock, Tex. 79415

Filed Aug. 4, 1986, Ser. No. 892,948
Int. Cl.[4] B60R *9/02*
U.S. Cl. 296—37.6 **9 Claims**



1. A toolbox adapted to be attached to a land vehicle having two ground engaging wheels on each side of the vehicle, a body including

i. a wheel well over each wheel,

ii. at least one door on each side of the vehicle between the wheel wells;

wherein the improvement comprises:

a top plate,

a back panel attached to

a bottom panel,

a side panel attached to the bottom panel,

a front end panel attached to the bottom panel, and

a rear end panel attached to the bottom panel,

tread material on the top plate to make it suitable for use as a running board,

attachment means on each end panel for attaching the end panels and thus the toolbox to the wheel wells of the vehicle,

end lips formed by bending a top edge of each end panel inward are located next to the top plate and parallel to the bottom panel,

a side lip formed by bending a top edge of a side panel outward is located next to the top plate and parallel to the bottom panel,

a back hip formed by bending an upper edge of the back panel inward,

a back lip formed by bending a top part of the back hip inward, the back lip located next to the top plate and parallel to the bottom panel and the back hip forming about a 45° angle both to the back panel and to the back lip,

said side panel, bottom panel, back panel, back hip, side lip, and back lip folded from a single sheet of metal with the side panel and back panel normal to the bottom panel,

a back shield attached to the back hip near the back panel and said shield spaced from the hip,

a flange on the shield above the top plate and normal to the bottom panel,

a back catch on the top plate between the shield and hip and parallel to the shield and hip,

a side face on the top plate extending downward parallel to the side panel,

a top lip on the side face extending inward parallel to the bottom panel, and

compressible material in the form of weather stripping attached to the top plate and contacting the end lips, back lip, and side lip.

4,696,508

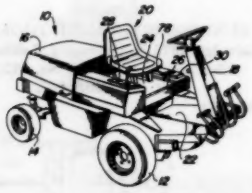
DEVICE HOLDING SEAT IN RAISED POSITION

Peter F. Brautigam, Kewaskum, Wis., assignor to Deere & Company, Moline, Ill.

Filed Aug. 4, 1986, Ser. No. 892,666

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—65 R **6 Claims**



1. A vehicle seat positioned over a battery for the vehicle and having a seat frame mounted on the vehicle to swing vertically about a transverse horizontal axis located forwardly of said battery, the improvement comprising: a battery housing including at least one vertical fore-and-aft extending plate positioned alongside the battery and having a vertical opening therein with opposed vertical edges and with the edge facing rearwardly having vertically spaced notches therein, each of said notches being formed by a convex entry lip extending forwardly to join a rear portion of a concave edge section of said notch that is lower than said lip, and continuing from said concave section to an upwardly and rearwardly extending inclined edge section that joins the rearmost end of the convex entry lip of the next higher notch; an L-shaped latch rod having a vertical leg portion positioned alongside said vertical plate with a lower end thereof extending horizontally into said opening and seatable in the concave section of a selected one of the said notches, said L-shaped latch rod having an upper horizontal leg portion journalled on the underside of said seat to rock about a transverse horizontal axis and extending to an end positioned adjacent an edge of the seat; a vertical hand lever rigid with the latter end and extending vertically upwardly for moving said lower end forwardly; and a prestressed spring extending between said vertical leg portion and said fore-and-aft extending plate for biasing said lower end toward said notches and to effect ratcheting of said lower end along said inclined edge sections between said notches and to effect seating in a selected concave edge section when the seat is released as said seat frame is swung vertically.

4,696,509

WINDSHIELD ADJUSTMENT DEVICE

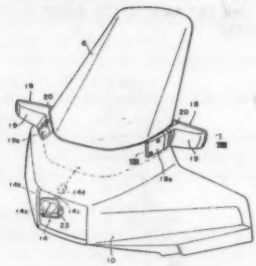
Akio Yagasaki, Fuchu, and Kazuo Marishima, Shiga, both of Japan, assignors to Honda Giken Kogyo KK, Tokyo, Japan

Continuation of Ser. No. 756,114, Jul. 18, 1985, abandoned. This application Aug. 13, 1986, Ser. No. 895,539

Claims priority, application Japan, Jul. 18, 1984, 59-147599; Jul. 20, 1984, 59-109624[U]

Int. Cl.[4] B62J *17/04*

U.S. Cl. 296—84 A **3 Claims**



1. Device for adjusting the windshield of a vehicle comprising left and right rear view mirrors attached to a frame, each of said mirrors having a mirror housing provided with generally vertically extending curved guide groove means engaged by side edges of said windshield, edges of said windshield operatively engaging in said guide groove means for generally vertical up-and-down sliding movement simultaneously producing a change in the angle of tilt of said windshield.

4,696,510

SWIVEL BEARING FOR AUTOMOBILE SUN VISORS

Gerhard Zwirner, Haan, Fed. Rep. of Germany, assignor to Gebr. Happich GmbH, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 882,084

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1985, 3524098

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—97 K **7 Claims**

1. A swivel bearing for supporting an automobile sun visor, the bearing comprising a visor shaft which includes a mounting arm and an attached support arm which meet to define an L-shape for the shaft, the support arm of the shaft being adapted for supporting a sun visor body;

the swivel bearing further comprising;

a bearing housing and means for fastening the bearing housing to the body of a vehicle;

a mounting bore defined in the bearing housing for receiving and supporting the mounting arm of the shaft therein, the mounting bore having an inlet wherein when the mounting arm is inserted in the mounting bore, the inlet is toward the support arm; the mounting bore having an outlet, the mounting bore being shaped to define at least over a part of its axial length a slot in which the mounting arm may tilt and pivot and the shaft of the sun visor is both tiltable in a cross axis direction and rotatable around its axis within the swivel bearing; the inlet of the mounting

bore being relatively more circular in shape than the outlet and the outlet of the mounting bore being relatively more oblong in shape than the inlet; the dimension of the oblong outlet along one short axis thereof being substantially equal to a diameter of the mounting arm of the shaft and wherein the dimension of the oblong outlet along a long axis thereof is larger than the diameter of the relatively more circular inlet; the support arm that supports the mounting shaft and is embedded in the main part of the sun visor being substantially parallel to the windshield; the major axis of the slot thereby paralleling the support arm that supports the mounting shaft of the sun visor which support arm also supports the main body of the sun visor.

4,696,511

OPENING ROOF ARRANGEMENT FOR A MOTOR VEHICLE ROOF

Bernard Laville, Bressuire, and Philippe Prouteau, Airvault, both of France, assignors to Etablissements Farnier & Penin, France

Filed Sep. 25, 1986, Ser. No. 911,336
Claims priority, application France, Sep. 26, 1985, 85 14270
Int. Cl.[4] B60J 7/047, 7/11
U.S. Cl. 296—216 **4 Claims**

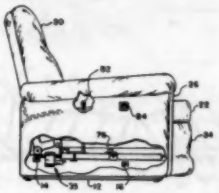
1. An opening roof arrangement for a motor vehicle roof, comprising a carrier structure (1) in the form of a frame which is capable of being mounted in an opening in a vehicle roof and retained on the edges thereof, a panel (3) which is mounted to a support assembly (5, 6, 7, 11) pivotably mounted on the frame (1) about a pivot axis which is parallel to and in the vicinity of the front edge of the frame, and an operating and locking member (16) which is mounted to the support assembly and which co-operates with a rear edge of the frame to cause said support assembly to pivot from a first position in which it extends in a horizontal plane of the frame (1), the panel (3) forming a closure means for the opening by resting on a sealing means (2) provided on the inside edge of the frame (1), to a second position in which the support assembly is inclined with respect to the horizontal plane of the frame (1) about said pivot axis, characterized in that said support assembly is formed by a pair of parallel telescopic struts (6, 7) which are substantially perpendicular to the pivot axis, each strut having a slideway member (6) which is pivotally mounted at one end (5) thereof about said axis and a slider (7) mounted slidably on said slideway member (6), the panel (3) being connected to each of said struts (6, 7) by a fixing member (8) having a first lug (9) mounted slidably in said slideway member (6) and a second lug (10) mounted slidably in said slider (7).

4,696,512

MOTORIZED RECLINER CHAIR WITH RELEASE MECHANISM

William Burnett, Livingston; James R. Houghton; David A. Walker, both of Cookeville, and Larry Key, Livingston, all of Tenn., assignors to Berkline Corporation, Morristown, Tenn.

Filed Mar. 6, 1986, Ser. No. 836,709
Int. Cl.[4] A47C 1/035
U.S. Cl. 297—68 **15 Claims**



1. In a recliner chair having a base, a seat-footrest assembly mounted on the base and movable between upright and recline positions and mechanical linkage operational for moving the seat-footrest assembly,

motor drive means mounted to said base and connected to the mechanical linkage by a spring biased decoupling means to actuate said mechanical linkage; and

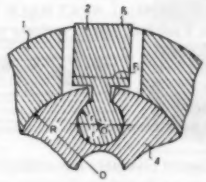
said spring biased decoupling means operable by an occupant of the chair for disengaging said motor drive means from said mechanical linkage so that the occupant can manually move said seat-footrest assembly independently of said motor drive means.

4,696,513

CHUCKING DEVICE FOR MACHINE TOOLS

Akira Nobukawa, 676, Mukai-nagatani, Ekiya-cho, Fukuyama, Hiroshima-ken; Tatsue Sawaguchi, 390-2, Habu-cho, Fuchu-shi, Hiroshima-ken, and Yoshihiro Kuroki, 69, Akaya, Kozan-cho, Sera-gun, Horishima-ken, all of Japan

Filed Aug. 20, 1985, Ser. No. 767,467
Int. Cl.[4] B23B 31/12
U.S. Cl. 279—121 **2 Claims**



1. A chuck device in a machine tool comprising:

(a) a body,

(b) a plunger and jaws engaged with said plunger, the engagement part of the respective jaws with said plunger being wedge-shaped,

(c) a sliding surface on the engagement part of the wedge part of jaws which, with the plunger, forms a circular arc, and

(d) slot grooves in said body;

(e) said jaws engaged with and inserted in said slot grooves;

(f) large, horizontal clearance being provided between said slot grooves and said jaws, whereby said jaws freely swing like a pendulum.

4,696,514

HIGH CHAIR WITH ADJUSTABLE BACK

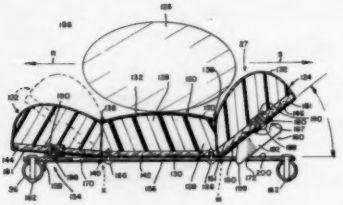
Kevin Maloney, Columbus, Ind., assignor to Cosco, Inc., Columbus, Ind.

Continuation of Ser. No. 747,855, Jun. 24, 1985, which is a division of Ser. No. 581,977, Feb. 21, 1984, Pat. No. 4,603,902. This application Sep. 5, 1986, Ser. No. 904,041

The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—284 **11 Claims**



1. A small child's chair comprising

a frame,

a seat having a base portion and a back support portion including a stationary central section and at least a first side section movable with respect to the stationary central section to position the child, and

retention means for retaining the movable first side section in a selected position relative to the stationary central section, the retention means including an elongated bar member fixed to the frame and being formed to include an aperture, means for attaching the bar member to the central section, and a latch member movably mounted to the first side section, the latch member including a first engaging portion for engaging the aperture of the bar member when the side section is in a first position to support the side section in the first position and a separate second engaging portion for lockably engaging the bar member when the side section is in a second position.

4,696,515

INFINITE MANUAL SEAT BACK RECLINER

Max O. Heesch, Ypsilanti, Mich., assignor to ITT Corporation, New York, N.Y.

Filed Feb. 24, 1986, Ser. No. 832,829

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—374 **12 Claims**

10. A seat recliner comprising:

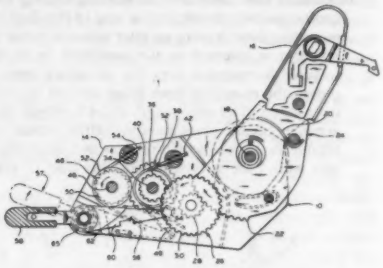
a base frame;

a seat back support pivotably mounted to said base frame for movement to a selected position between an upright position and a reclined position including a sector gear;

a gear set mounted to said base frame meshed with said sector gear;

first spring coil clutch means operatively connected to said gear set for releasably holding said seat back support in said selected position against a first rotational load developed in a first direction at said seat back support; and

second spring coil clutch means operatively connected to said first spring coil clutch means by a load reduction gear interposed between said first spring coil clutch means and said second spring coil clutch means for releasably holding said seat back support in said selected position against



a second rotational load developed in a second direction at seat back support.

4,696,516

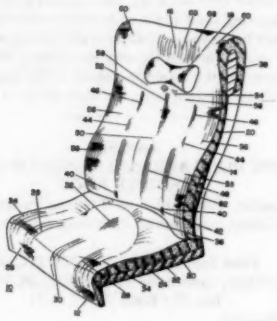
CONTOURED AIRCRAFT AND CAR SEAT

Hee-Sung Yeum, Seoul, Rep. of Korea, assignor to DAE-AH Human Engineering Inc., Rep. of Korea

Continuation of Ser. No. 793,590, Oct. 31, 1985. This application Oct. 3, 1986, Ser. No. 915,942

Int. Cl.[4] A47C *7/02*

U.S. Cl. 297—458 **15 Claims**



1. A contoured seat, comprising:

a bottom portion having a bottom cushion disposed on top of a bottom support and attached to a basic frame, said bottom cushion comprising urethane foam having a plurality of indentations and having a curved front edge, rear edge and side edges, a downwardly sloping center ridge extending perpendicular to said front edge and extending from, at its highest point, the center of said front edge to, at its lowest point, halfway across said bottom portion, an indented fundament section of semielliptical shape having an open end, which section receives said lowest point of said center ridge generally at the center of its open end, and a rear portion formed between said rear edge and said fundament section, and thigh portions which are surrounded by side portions that adjoin said side edges and are separated by said center ridge, which thigh portions are indented and extend from said front edge into said fundament section below said surrounding rear and side portions to provide a receiving area in which a person comfortably sits;

a back portion, supported by said basic frame and a plastic frame attached thereto, said back portion having a lower edge, top edge and side edges, said lower edge being adjustably attached to said rear edge of said bottom por-

tion, said back portion being divided by a central plane extending from the center of said lower edge to the center of said top edge, where said central plane has a first central plane portion adjoining said bottom portion and extending slightly outwardly to support the person's extreme lower back area, a second central plane portion extending outwardly in the lordotic direction, a third central plane portion extending inwardly in the kyphotic direction, and a fourth central plane portion extending outwardly to meet the upper back in the area between the shoulder blades, said back portion further having two lower side portions symmetrically disposed about said first central plane portion to support the body's hip area, two through portions symmetrically disposed about said second and third central plane portions, and two thoracic portions symmetrically disposed about said fourth central plane portion to support the shoulder blades, wherein between said back portion and said basic frame is disposed a memory material support, which extends between said side edges of said back portion and from said first central plane portion to said third central portion, so as to conform to the lower back of said person using said seat.

4,696,517

DUMPING MECHANISM FOR A DUMPING TOY TRUCK

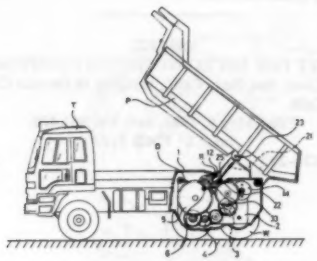
Toshiaki Nagano, Tokyo, Japan, assignor to Shinsei Kogyo Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,453

Claims priority, application Japan, Sep. 26, 1984, 59-145156[U]; Sep. 26, 1984, 59-145157[U]

Int. Cl.⁴ A63H *17/05*

U.S. Cl. 298—1 T **4 Claims**



1. A dumping mechanism for a dumping toy truck, which is mounted in a car body for lifting a rear deck to an inclined position and which comprises a lifting rod that extends retractably from the car body, characterized in that the car body at its upper wall is provided with a passing means whose exterior surface is convex in an extension direction of the lifting rod and has a hole of longer dimension in an oscillating direction for passing the lifting rod therethrough, and in that the passing means has an interior concave surface which is slidably in contact with a corresponding convex surface of a covering element which consists of a sealing part having a through-hole for passing the lifting rod and side walls at either side of the sealing part, each of said side walls being provided with a bearing pin protruding therefrom for swingably supporting said covering element on the toy truck, the lifting rod being movable in the extension direction through said hole and said through-hole.

4,696,518

CUTTING MACHINE

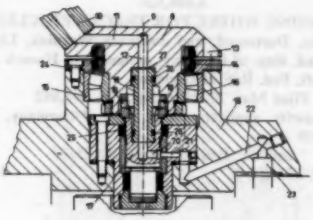
Alfred Zitz, and Wilfried Maier, both of Zeltweg, Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Jan. 14, 1986, Ser. No. 818,750

Claims priority, application Austria, Jan. 21, 1985, 139/85

Int. Cl.⁴ E21C *25/00*; E21B *10/60*

U.S. Cl. 299—75 **13 Claims**



1. In a cutting machine: a cutting arm which is swivellable in height direction and in lateral direction; at least one cutting head rotatably supported on said cutting arm for rotation about an axis transverse to the axis of the cutting arm, said cutting head having internal gearing for driving the same and having external cutting bits and water spray nozzles, and said cutting head being composed of a plurality of discs arranged coaxially with said transverse axis, one of which discs is an outermost disc located remote from said cutting arm relative to other discs and can remain stationary while the rest of the cutting head rotates; and a water supply system for supplying water to the nozzles, said water supply system comprising an axial cavity in said cutting head, a stationary water supply conduit having a discharge end and an essentially axial bore in said outermost disc placing said discharge end of said water supply conduit in communication with said axial cavity in said cutting head.

4,696,519

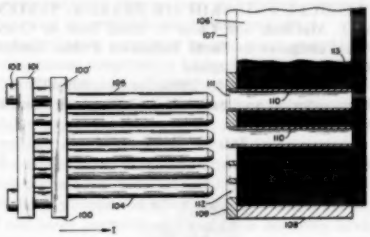
FILAMENT STOCK BOX AND PICKING APPARATUS

John C. Lewis Jr., Salisbury, Vt., assignor to Tucel Industries Inc., Forest Dale, Vt.

Filed Mar. 11, 1986, Ser. No. 838,549

Int. Cl.⁴ A46D *1/08*

U.S. Cl. 300—7 **12 Claims**



1. In an apparatus for making tufted, fused constructions of at least two different types of synthetic cut-to-length filament tufts including means for picking said tufts including at least two hollow picking tubes, means for simultaneously heat sealing and pre-fusing the non working ends thereof and means for simultaneously fusing said pre-fused ends onto a substrate, the improvement comprising:

at least two stock boxes, each containing a different type of filament, each box having a face with apertures therethrough disposed to register with and to receive said

picking tubes, the filament therein being oriented longitudinally perpendicular to said face; and

filament blocking means disposed within each stock box for vacating an area of filament behind at least one of said apertures so that when the picking tubes enter the apertures at least one of said tubes will not pick a tuft, and at least one of said tubes will pick a tuft of filament.

4,696,520

RUNNING WHEEL FOR TRACK VEHICLES

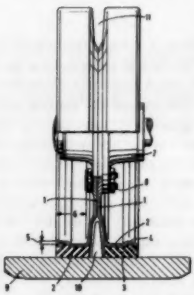
Klaus Henke, Dortmund, and Johannes Wozniak, Lippstadt, both of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 844,852

Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515918

Int. Cl.[4] B60B *3/04*; B62D *55/08*

U.S. Cl. 301—63 DS **4 Claims**



1. A running wheel for track vehicles comprising two similar discs attached in back-to-back relationship and defining therebetween a radially extending guide gap for track teeth, each of said discs having a substantially axially extending outer annular surface, a hollow tubular rubber coating disposed about the outer annular surface of each disc, the axially outer third of the outer annular surface of each disc including a radially inwardly directed annular stiffening bead, and each rubber coating having a complimentary annular bead entered in its annular disc bead to retain the coatings against relative axial displacement.

4,696,521

VEHICLE ANTI-SKID AIR BRAKING SYSTEMS

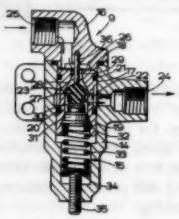
Denis J. McCann, and Colin F. Ross, both of Crickhowell, Wales, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Mar. 13, 1986, Ser. No. 839,427

Claims priority, application United Kingdom, Mar. 18, 1985, 8506978

Int. Cl.[4] B60T *11/34*

U.S. Cl. 303—92 **8 Claims**



1. A vehicle anti-skid air braking system comprising a supply of compressed air, an air reservoir connected to said supply, a wheel brake, a service wheel brake actuator operatively connected to said wheel brake, a relay valve means controlling communication between said service wheel brake actuator and said reservoir, and between said service wheel brake and atmosphere, a brake pedal, a service air supply controlled by said brake pedal and connected to said relay valve means for controlling the operation thereof, a skid sensor for providing skid signals, a modulator valve means accodiated with said relay valve means, said modulator valve means operating said relay valve means in response to a skid signal from said skid sensor to modulate the pressure applied to said service wheel brake actuator; a spring brake actuator operatively connected to said wheel brake, and a spring brake supply circuit for connecting said spring brake actuator to said reservoir, said spring brake supply circuit incorporating a spring brake operating valve means for isolating said spring brake actuator from said reservoir and a control valve means, said control valve means operating in response to a control pressure and having first and second conditions, and changing from said first to said second condition in response to a drop in said control pressure below a predetermined value, whereby in said first condition said control valve means comprises a one-way valve substantially preventing return flow of air from said spring brake actuator to said reservoir, and in said second condition said one-way valve is disabled to permit said return flow of fluid through said one-way valve itself, said control valve means comprising a housing with a bore having first and second ends, a hollow piston slidably sealed in said bore, said piston having first and second ends, and an interior, a valve seat on said piston, and a one-way valve member housed in said piston, with resilient means biassing said valve member against said seat, said valve seat surrounding a port extending axially through said first end of said piston, a valve control pin in said first end of said bore extending through said port for unseating said valve member when said piston is urged towards said control pin, said first end of said bore being connected to a first housing port for connection to said reservoir and said interior of said piston being connected to a second housing port for connection to said spring brake actuator.

4,696,522

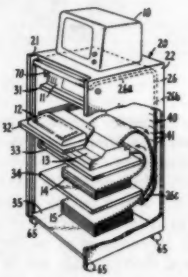
CABINET FOR MICROCOMPUTER COMPONENTS

Gary M. Lowe, San Jose, Calif., assignor to Devoke Co., Santa Clara, Calif.

Filed May 9, 1986, Ser. No. 861,430

Int. Cl.[4] E06B *9/14*

U.S. Cl. 312—297 **2 Claims**



1. A cabinet for housing microcomputer components comprising:

side walls

a rear wall

a top

shelf means for supporting a printer, a supply of paper for said printer and a stack of printed paper, said paper pass-

ing through said printer and moving downwardly toward said stack of printed paper,

each of said side walls having a tambour door guide, comprising a groove formed therein in which a tambour door means slides, said groove having a portion extending downwardly adjacent said rear wall, and said groove having a further portion extending forwardly below said printer towards the front of the cabinet

tambour door means guided by said guide and movable between open and closed positions, said tambour door forming a front wall enclosing said cabinet in the closed position said tambour door means, in said open position, having an inturned end which is caused by the door being guided by the forwardly extending portion of the guide means so that in said open position said inturned end is positioned above said stack of printed paper and below said printer, said inturned end forming a baffle, said baffle serving to deflect, fold and stack said printer paper in a fanfold stack on a shelf below said printer.

4,696,523

DEVICE FOR TRANSFERRING CURRENT BETWEEN TWO CONTACT POINTS WHICH ARE MOVABLE RELATIVE TO EACH OTHER

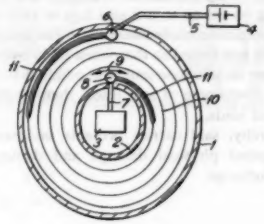
Friedrich Schauer, Heroldsberg, and Hans Berthold, Eckenthal-Brand, both of Fed. Rep. of Germany, assignors to Kabelmetal Electro Gesellschaft mit beschränkter Haftung, Hanover, Fed. Rep. of Germany

Filed Sep. 16, 1986, Ser. No. 907,872

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541287

Int. Cl.[4] H01R *39/00*

U.S. Cl. 439—11 **10 Claims**



1. In a device for transferring electric current between two contact points connected by a ribbon cable serving for the electrical connection, the cable having at least two electric conductors and being wound in the manner of a spring with its turns lying concentric to each other, and wherein ends of the cable are firmly attached to the two contact points, and at least one of the two contact points is movable relative to the other on a path concentric to the turns of the ribbon cable, the improvement comprising

a strip-shaped stabilizer of dimensionally stable plastic and having a U-shaped cross section which is bent to follow a radius of curvature of the ribbon cable, said stabilizer being at least as wide as the ribbon cable and closely enclosing the ribbon cable on opposite flat sides and one narrow side of said ribbon cable, and wherein

said stabilizer, in cross-sectional dimensions, is long relative to its width.

4,696,524

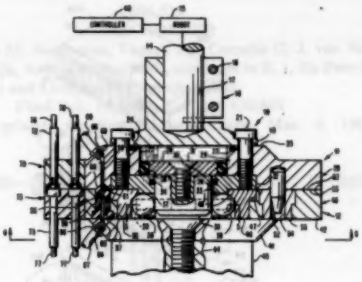
ROBOT ARM COUPLING APPARATUS

William C. Cloyd, Lexington, Ky., assignor to Custom Tool & Mfg. Co. and Automation Development Corporation, both of Lexington, Ky., part interest to each

Filed Mar. 3, 1986, Ser. No. 835,520

Int. Cl.[4] H01R *13/62*

U.S. Cl. 439—197 **20 Claims**



1. An apparatus for connecting a tool or the like to a robot arm including:

an inner assembly;

means to attach said inner assembly to a robot arm;

an outer assembly;

said outer assembly including means for attachment to a tool or the like;

locking means to lock said outer assembly to said inner assembly;

said locking means including;

means slidably supported by said inner assembly;

first means to cause movement of said slidably supported means to move said slidably supported means to its locking position, said slidably supported means remaining in the locking position after said first means is rendered ineffective;

second means to cause movement of said slidably supported means to remove said slidably supported means from the locking position;

a plurality of balls surrounding said slidably supported means and supported by said inner assembly;

a cam locking ring supported by said outer assembly and having means cooperating with said balls to retain said balls to lock said outer assembly to said inner assembly when said first means of said locking means moves said slidably supported means to the locking position;

and resilient means supported by said inner assembly to move said balls out of retention by said cam locking ring when said second means of said locking means removes said slidably supported means from the locking position;

each of said inner assembly and said outer assembly having electrical means cooperating with each other to provide a plurality of electrical connections extending through said inner assembly and said outer assembly when said inner assembly and said outer assembly are locked to each other by said locking means;

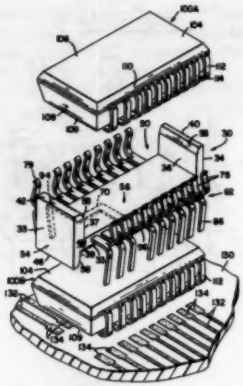
and each of said inner assembly and said outer assembly having air passage means cooperating with each other to provide a plurality of air sealed passage means extending through said inner assembly and said outer assembly when said inner assembly and said outer assembly are locked to each other by said locking means.

4,696,525

SOCKET FOR STACKING INTEGRATED CIRCUIT PACKAGES

James R. Coller, Kernersville, and Joseph R. Goodman, Walkertown, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 13, 1985, Ser. No. 809,091
Int. Cl.[4] H01R *13/00*
U.S. Cl. 439—69 **17 Claims**



1. A socket for interconnecting two integrated circuit packages, each having a plurality of package leads extending from opposite sides, the socket comprising means for stacking the two integrated circuit packages and commoning package leads, the socket further comprising:

a central body, and

a plurality of socket leads, each lead comprising a central portion lying along a central plane common with all central portions, each central portion being partially embedded within the body and extending therefrom, and two contact arms extending from the associated central portion, the arms extending in opposite directions from the plane of the central portion, a first plurality of contact arms extending upwardly and transversely of the central plane establishing a first socket, and a second plurality of contact arms extending downwardly and transversely of the central plane to establish a second socket, whereby

the contact arms interconnect the package leads of the integrated circuit packages, one package disposed above and one package disposed below the socket body.

4,696,526

CARRIER FOR TAPE AUTOMATED BONDED SEMICONDUCTOR DEVICE

Edward L. Newton, Tempe, and Steven D. Swendrowski, Chander, both of Ariz., assignors to Intel Corporation, Santa Clara, Calif.

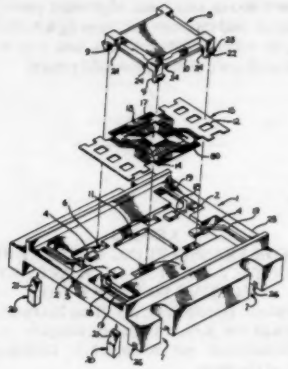
Filed Jul. 26, 1985, Ser. No. 759,657
Int. Cl.[4] H05K *1/00*
U.S. Cl. 439—68 **3 Claims**

1. A carrier for holding a semiconductor device attached to a tape during testing of said semiconductor device, said device being bonded to leads attached to said tape, said leads being coupled to test pads, located on said tape, for making contact to circuits in said semiconductor device, said carrier comprising:

a base unit having a seating plane on which said tape is mounted, said base unit having recesses located on the outer frame of said unit for aligning a punching die with said base unit and portions thereof;

at least two retractable latches on said base unit, each of said latches having a tip that abuts the top of said tape when said latch is not retracted and when said tape is mounted on said seating plane so that said latch secures said tape against said seating plane, each of said latches having an arm connected to said tip, said arm being attached to said base unit and being flexible so that said latch may be retracted thereby lifting said tip off said tape permitting said tape to be removed from said carrier; and

at least two alignment posts protruding from said seating plane, said alignment posts engaging sprocket holes in said tape to align said tape to said base unit so that a plating bus node on said tape, which plating bus node couples at least some of said leads, is aligned over an opening in said seating plane, said opening accepting said punching die so that said plating bus node can be punched out of said tape



while said tape is in said carrier thereby making said circuits available for testing;

a cover for protecting said device, said cover having at least two legs to engage receptacles in said seating plane, said legs being positioned to engage said receptacles and having means to secure said legs to said base unit, and

a conductive blade attached to the underside of said cover and positioned so that when said cover is placed over said tape on said base unit, said conductive blade interconnects at least some of said leads, thereby shorting out some of said leads;

whereby, said carrier protects said semconductor device against physical damage and damage by electrostatic discharge.

4,696,527

CABLE CONNECTOR

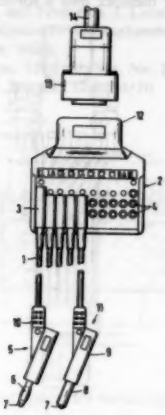
Wolfgang Ding, Brunswick, and Werner Arnold, Juechen, both of Fed. Rep. of Germany, assignors to ARBO Medizin-Technologie GmbH., Braunschweig, Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 864,136
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1985, 8533107[U]
Int. Cl.[4] H01R *13/66, 29/00*
U.S. Cl. 439—53 **3 Claims**

1. A cable connector arrangement which connects a multiplicity n of separate body electrode cables to an at least n-pole trunk cable having a first connector fixedly connected thereto that is connectable to a control apparatus, comprising:

an intermediate connector having a plurality of contacts which receives one end of the body electrode cables and

having a second connector for receiving the first connector of said trunk cable; and



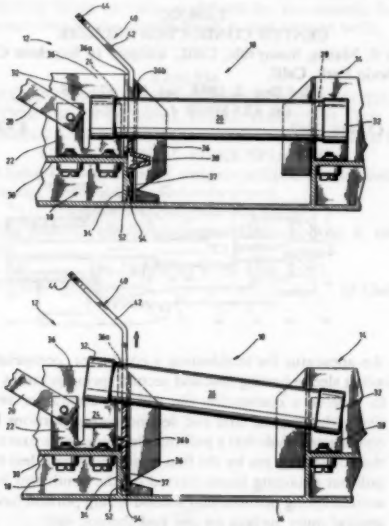
protective resistors within the intermediate connector, each arranged in series in an electrical connection with at least one of said contacts and a pole of said second connector.

4,696,528

FUSIBLE SWITCH AND FUSE PULLER ASSEMBLY

Carey D. Harnois, Charlottesville, Va., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 1, 1986, Ser. No. 891,976
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—160 **18 Claims**



1. A fuse puller apparatus comprising:

a fuse puller body including

a handle portion;

the fuse engaging portion; a lower end portion;

a body portion between said fuse engaging portion and said lower end portion, said body portion having a transverse length between said fuse engaging portion and said lower end portion; and

means for allowing expansion of the transverse length of said body portion between said fuse engaging portion and said lower end portion.

4,696,529

CARD HOLDER

Laurentius M. Verhoeven, Veghel, and Cornelis G. J. van Nes, Oisterwijk, both of Netherlands, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 19, 1986, Ser. No. 830,841
Claims priority, application Netherlands, Mar. 1, 1985, 8500587
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—267 **10 Claims**

1. A holder for receiving a card with electronically stored data or a printed circuit board comprising:

guide means forming part of said holder and an connector being provided with a plurality of contact springs for contacting connection strips disposed on said card or board, one end of each said contact spring being clamped while the other end is freely movable and makes contact with one of the connection strips when the card or board is inserted;

each said contact spring having a first spring end part which is adjacent to the movable end of the contact spring, an intermediate spring part bent into a U-shape and a second clamped spring end part serving as connection terminal, in which the one and the other legs of the U join the first and second spring end parts respectively, said first spring part being disposed substantially perpendicular to the intermediate spring part, and said intermediate part being substantialy perpendicular to the infeed plane of the holder;

a stop element located at the point where the first spring end part and the intermediate spring part join, said stop element extending from the plane of the first spring end part into the infeed plane of the holder;

whereby in the rest condition, the legs of the intermediate spring part converge slightly to each other in the direction of their ends;

said first spring end part extending slanting past the infeed path of the connection strips of the card or board; and

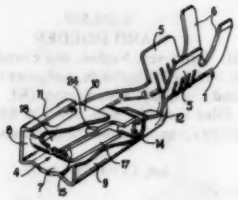
a biasing rod having a substantially rectangular cross-section to be inserted and/or operated from outside, said rod lying parallel to and between the stop elements and the bottom of the holder in the rest condition of the contact springs and when rotated by a fourth of one revolution, the U-legs and the first spring end parts are bent from the infeed path of the connecting strips, so that in the subsequent inserting of the card or board without contact pressure, said card or board abuts with its front edge against the stop elements of the contact springs, whereafter the biasing rod is newly rotated by a fourth of one revolution and then the contacting strips contact the contact points of the first end part of the springs.

4,696,530

FEMALE ELECTRICAL CONTACT ELEMENT

Bertrand Vandame, Villepreux, France, assignor to Precision Mechanique Labinal, Bois d'Arcy, France

Filed Nov. 5, 1986, Ser. No. 927,189
Claims priority, application France, Nov. 5, 1985, 85 16351
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—266 9 Claims



1. A female electrical contact element fabricated from thin sheet metal that is resilient and a good conductor of electricity comprising:

(a) An anterior portion at one end including means for attachment to an electrical conductor, and

(b) a posterior portion at an opposite end including a channel having a substantially rectangular transverse cross-section adapted to receive a substantially flat male contact member, said channel comprising:

(i) a base provided with an opening adapted to receive a catch;

(ii) two side walls attached to said base; and

(iii) a top wall, attached to one of said side walls, having an extended portion with a free end bent into a hook-shaped catch and folded so as to be positioned between said top wall and said base within said channel, said extended portion including a slot having a generally elongate area dividing said extended portion into two elongate members, wherein said elongate area of the slot has a longitudinal axis parallel to a longitudinal axis of said extended portion, and said slot further includes a transverse area having an axis offset by an angle from said longitudinal axis which opens into an edge of said extended portion, so that one of said two elongate members is a shorter member and the other of said two elongate members is a longer member, wherein said longer member is integral with said free end of the extended portion and is adapted to be engaged by a male electrical contact member, and wherein said shorter member is adapted to make electrical contact with a male electrical contact member.

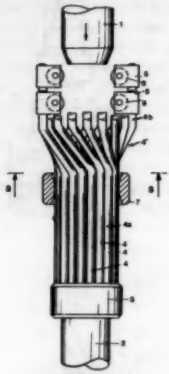
4,696,531

PLUG-IN TYPE CONTACT ARRANGEMENT

Helmut Böhme; Helmut Löbl, and Steffen Grossmann, all of Dresden, German Democratic Rep., assignors to VEB "Otto-Buchwitz" Starkstrom-Anlagebau Dresden, Dresden, German Democratic Rep.

Filed Nov. 8, 1985, Ser. No. 796,371
Claims priority, application German Democratic Rep., Dec. 20, 1984, 2712595
Int. Cl.[4] H01R *13/11*
U.S. Cl. 439—851 6 Claims

1. An electrical plug-in type contact arrangement comprising a first movable contact member, a second fixed contact member, a plurality of contact fingers, means for mounting said plurality of contact fingers on said second contact member, each of said contact fingers comprising at a free end portions thereof a contact element, each of said contact fingers being crimped or twisted to form a first portion of said contact finger in one axial plane and to form a second portion of said contact finger in a different axial plane offset with respect to the first axial plane, thereby to transform a pressure exerted by said first contact member when moved into contacting position towards said second contact member into a torsional loading arising



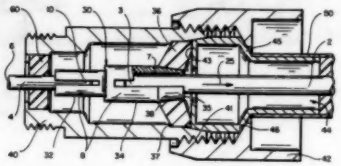
within said contact fingers, means for surrounding said contact fingers adjacent the region of the crimping said contact fingers having free end portions each having a contact element adapted to exert pressure on the movable contact.

4,696,532

CENTER CONDUCTOR SEIZURE

John S. Mattis, Sunnyvale, Calif., assignor to Raychem Corp., Menlo Park, Calif.

Filed Dec. 3, 1984, Ser. No. 677,155
Int. Cl.[4] H01R *4/50, 17/04*
U.S. Cl. 439—863 8 Claims



1. An apparatus for terminating a conductor, comprising:

a spring sleeve having first and second spring portions sized to receive a connection pin and the conductor respectively therein, the first and second spring portions being constructed such that a pull-out clamping force exerted on the connection pin by the first spring portion is less than a pull-out clamping force exerted on the conductor by the second spring portion, said second spring portion having a conical outer surface on one end thereof; and

means for engaging said conical outer surface such that movement of said spring sleeve relative to said engaging means along a predetermined direction increases said clamping force on said conductor, the connection pin being fixed and contained within the first spring portion of the spring sleeve, the spring sleeve being preferentially moveable relative to the connection pin rather than the conductor when the conductor is urged axially away from the connection pin.

4,696,533

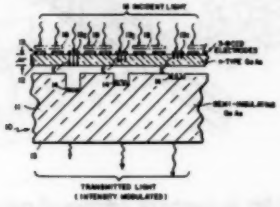
SPATIAL LIGHT MODULATOR

Robert H. Kingston, and Frederick J. Leonberger, both of Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 12, 1981, Ser. No. 224,140

Int. Cl.[4] G02B 6/10

U.S. Cl. 350—96.14 17 Claims



1. An electro-optical system for use as a spatial light modulator comprising

a substrate;

a charge-coupled device formed in a layer at a selected surface of said substrate, said layer having a plurality of electrodes each having a charge storage well associated therewith;

means for supplying input data to said charge-coupled device so that the charge levels in each of said charge storage wells represent the magnitude of said input data;

said charge-coupled device being arranged so that an input electromagnetic wave can be directed through said electro-optical system to provide an output electromagnetic wave, the intensity of said output electromagnetic wave thereby being spatially modulated by the electric fields controlled by the charge levels in said storage wells.

4,696,534

APPARATUS FOR EXTRACTING LIGHT FROM THE CORE OF AN OPTICAL FIBRE THROUGH THE CLADDING AND BUFFER COATING THEREOF AND ITS USE IN OPTICAL FIBRE SPLICING

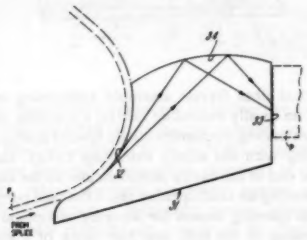
Sanjiv Saha, London, England, assignor to BICC Public Limited Company, London, England

Filed Jul. 30, 1985, Ser. No. 760,675

Claims priority, application United Kingdom, Aug. 8, 1984, 8420135

Int. Cl.[4] G02B 6/26, 6/38

U.S. Cl. 350—96.15 13 Claims



1. Apparatus for extracting light from the core of an optical fibre through the cladding and buffer coating thereof, which apparatus comprises a body which is made of a substantially rigid transparent material and which has at least three faces, a contact face which is of substantially arcuate shape and which is adapted to bear against a smoothly curved length of buffer coated optical fibre, an exit face through which light emerging from the optical fibre and into the body can pass and a reflecting face which is of substantially arcuate shape and which will reflect light entering the body through said contact face in a direction towards said exit face, the shapes of said contact, reflecting and exit faces and the positions of the reflecting and exit faces relative to the contact face being such that at least a major proportion of light passing from the core of a smoothly curved length of buffer coated optical fibre against which said body bears, through the cladding and buffer coating of the optical fibre and through the smoothly curved contact face into the body will be directed and reflected towards said exit face from where it can pass into a light detector.

4,696,535

APPARATUS FOR INJECTING LIGHT THROUGH A BUFFER-COATED OPTICAL FIBRE INTO THE CORE THEREOF AND ITS USE IN OPTICAL FIBRE SPLICING

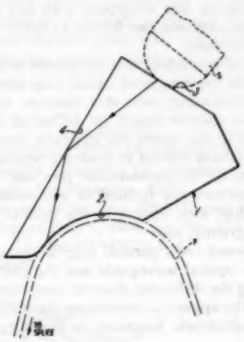
Sanjiv Saha, London, England, assignor to BICC Public Limited Company, London, England

Filed Jul. 30, 1985, Ser. No. 760,681

Claims priority, application United Kingdom, Jul. 30, 1984, 8419408

Int. Cl.[4] G02B 6/26, 6/38

U.S. Cl. 350—96.15 12 Claims

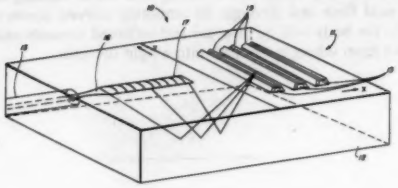


1. Apparatus for injecting light through a buffer coated optical fibre into the core thereof, which apparatus comprises a body which is made of a substantially rigid transparent material and which has at least three faces inclined relative to one another, said faces including a contact face which is of substantially arcuate shape and which is adapted to bear against a smoothly curved length of buffer coated optical fibre, an entry face through which light emitted by a light source can be injected into the body in a direction towards said contact face and a reflecting face which is of substantially planar form and which will reflect injected light in a direction towards said contact face, the inclinations of said faces relative to one another being such that at least a major proportion of light injected through the entry face into the body will be directed or reflected towards a part of the length of said smoothly curved contact face from where it will pass through the buffer coating and cladding of an optical fibre against which said body bears into the core of the optical fibre.

4,696,536
INTEGRATED OPTICAL WAVELENGTH DEMULTIPLEXER

Donald J. Albares, and Ronald E. Reedy, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 1, 1985, Ser. No. 750,630
Int. Cl.[4] G02B 6/34
U.S. Cl. 350—96.19 **15 Claims**



1. An apparatus for wavelength demultiplexing single mode optical data transmitted in a plurality of discrete optical wavelengths on an integrated chip substrate comprising:

an optical waveguide disposed on and integrated with the integrated chip substrate for guiding the plurality of optical wavelengths therethrough:

means provided to coextend in the integrated optical waveguide for diffracting the plurality of optical wavelengths therefrom, the diffracting means being configured in a chirped grating to diffract each of the plurality of optical wavelengths into focussed discrete beams at discrete diffraction angles out of the plane of the chirped grating that are different one from the other;

a semiconductor film integrated with and disposed on the integrated chip substrate having its lattice matched to that of the substrate;

a plurality of photodetectors integrated in the semiconductor film on the integrated circuit chip substrate in a juxtaposed relationship each at a location corresponding to where the discrete beams are diffracted and focussed for intercepting the beams and optically detecting the information content thereof to generate representative electrical signs, the seminconductor film and the plurality of photodetectors are located in a substantially coplanar relationship with respect to the optical waveguide and chirped grating; and

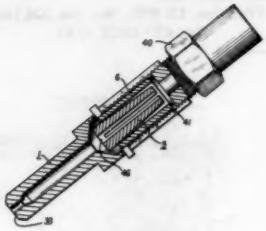
means disposed on a parallel side of the substrate spaced from the optical waveguide and the chirped grating for reflecting the diffracted discrete beams onto the photodetectors, the apparatus combining the optical demultiplexing and electronic functions on the integrated chip substrate.

4,696,537
CONNECTOR FOR FIBER OPTIC CABLES

Anton E. Bauer, Neckarsulm; Gerhard Billmann, Bad Rappenau; Jörg Rathke, Untergruppenbach; Hans-Joachim Schimanek, Heilbronn; Georg W. Schrott, Heilbronn, and Hans Wodok, Heilbronn, all of Fed. Rep. of Germany, assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Oct. 24, 1980, Ser. No. 200,124
Claims priority, application Fed. Rep. of Germany, Oct. 25, 1979, 2943180
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 **20 Claims**

1. A connector for a cable containing at least one fiber optic filament and having an outer jacket surrounding said filament, said filament tending to move relative to said jacket in lengthwise direction of said cable under at least one of temperature change and bending influences, said connector comprising a housing including a front part having a bore for receiving said filament and means for fastening said filament to said front part in a filament fastening zone, a rear part having means for fastening said jacket thereto in a jacket fastening zone, and means for holding said filament fastening zone in a fixed spaced

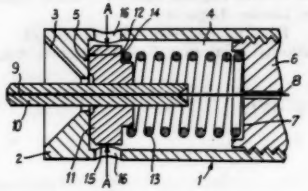


relationship in lengthwise direction of said cable from said jacket fastening zone and defining a space therebetween for receiving a portion of said filament with substantial looseness to provide freedom of lateral movement to said filament.

4,696,538
OPTICAL FIBER CONNECTOR AND METHOD OF MECHANICALLY CENTERING AN INTERIOR ELEMENT IN AN OUTER BODY

Jean-Bernard Despouys, Paris, France, assignor to Radiall Industrie, Rosny-Sous-Bois, France

Filed May 13, 1985, Ser. No. 733,318
Claims priority, application France, May 11, 1984, 84 07300
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 **6 Claims**



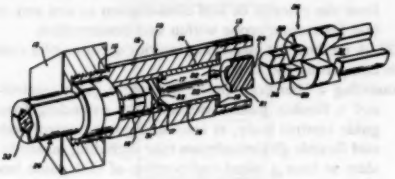
1. An optical fiber ferrule assembly comprising an outer body having an axially extending cavity, a plurality of generally radially extending circumferentially spaced apart openings communicating with the axially extending cavity, and a flat surface at one end of the cavity perpendicular to the axis of the body, a hub having an axial opening and a flat face perpendicular to its axial opening, means for securing an optical fiber in the axial opening of the hub, said hub being of a size to be received in said cavity, said hub having a flat face seatable on said flat surface of said outer body, means within said outer body for elastically pressing said hub against said body, and surface means on said hub in the region of said radial openings for engagement by a tool to displace said hub and fiber perpendicular to the axis of the body by sliding the face of the hub on the surface of the body, to adjust the radial position of the hub and fiber in the body.

4,696,539

FIBER OPTIC CABLE CONNECTOR

Robert G. Knowles, Northfield, Conn., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Jul. 23, 1984, Ser. No. 633,704
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.21 11 Claims



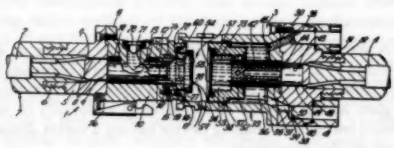
1. A connector for optical fibers, comprising:
an elongated tubular housing having a bore therethrough
a first and a second termination-assembly means, each surrounding an end of a optical fiber for positioning each optical fiber in said housing;
a pair of lens elements, wherein one of the lens elements is adjacent one end of each termination-assembly means;
a first and a second sleeve, each surrounding one lens element and a portion of said termination-assembly means adjacent each lens element; and
means on each sleeve for spacing said lens element one from another, wherein each sleeve is mounted in the bore of said housing to coaxially align said pair of lens elements with each other.

4,696,540

OPTICAL FIBRE CONNECTOR HAVING PARTICULAR UTILITY FOR UNDERWATER USE

Graham L. Adams, London, and Richard C. E. Durrant, Bishops Stortford, both of England, assignors to STC, plc, Strand, England

Filed Nov. 18, 1985, Ser. No. 799,313
Claims priority, application United Kingdom, Dec. 12, 1984, 8431281
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 19 Claims



1. An optical fibre connector including two connector elements, wherein when the connector elements are disconnected optical fibre terminations to be optically coupled by the connector are disposed in respective chambers of the connector elements, which channels are sealed against external fluid pressure by respective diaphragm means, wherein when the two connector elements are connected the diaphragm means are in sealing contact with one another and the terminations of the connector element are disposed in the chamber of the other element having penetrated both diaphragm means, and wherein each of the optical fibre terminations of one connector element is secured to one end of a respective flexible tube through which the respective optical fibre extends, the other end of which tubes are secured to a housing member of the one connector element.

4,696,541

OPTICAL CABLE HAVING A PLURALITY OF BASIC ELEMENTS ARRANGED IN A COMMON SHEATH

Helmut Haag, Waldniel, and Klaus Nothofer, Düsseldorf, both of Fed. Rep. of Germany, assignors to AEG Kabel Aktiengesellschaft, Monchen-Gladbach, Fed. Rep. of Germany

Filed Dec. 20, 1983, Ser. No. 563,463
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1982, 3247090
Int. Cl.[4] G02B 6/44
U.S. Cl. 350—96.23 32 Claims

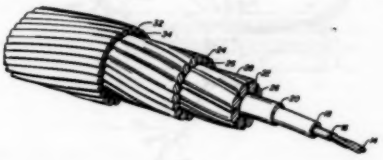
1. An optical cable having a radial direction comprising a common sheath and a plurality of elongate basic elements enclosed by said common sheath, each said basic element comprising a stable sheath and at least one optical fiber housed and loosely guided in said stable sheath, and said plurality of basic elements being assembled together to form a plurality of basic units each of which is composed of several of said basic elements and is deformable transverse to the length of said basic elements, said plurality of basic units being assembled together to form at least one cylindrical layer of said cable, with each said basic unit in said cylindrical layer having a noncircular cross-sectional configuration which is flattened in the radial direction of said cable, while said stable sheaths of said basic elements are not significantly deformed, as a result of a deformation pressure exerted radially inwardly on said circular layer.

4,696,542

ARMORED OPTICAL FIBER CABLE

Robert E. Thompson, Roanoke, Va., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 408,975, Aug. 17, 1982. This application Dec. 7, 1984, Ser. No. 679,195
Int. Cl.[4] G02B 6/44
U.S. Cl. 350—96.2 10 Claims



1. An abrasion resistant well logging cable having a design breaking load at least as great as about 10,000 pounds, and being adapted to be wound repeatedly about sheaves and wound and unwound from a drum, said cable comprising the combination of:
optical fiber means having a proof test stress value of at least about 150,000 pounds per square inch;
and a compact arrangement of layers of helically wound strength elements surrounding and protecting said optical fiber means; said arrangement having such a low permenant radial contraction under repeated loading to about 90% of the design breaking load that said cable's permanent elongation after being stretched repeatedly to about 90% of the design breaking load is no greater than about

0.4% and including at least two torque balancing layers wound in opposite helical directions.

4,696,543

OPTICAL FIBER CABLE HAVING A LOW PERMEABILITY TO HYDROGEN

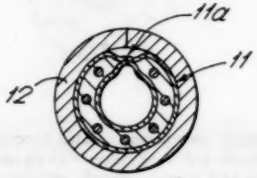
Gilles D. Pitt, Saffron Walden; Philip Extance, Cambridge, and Roger E. Jones, Little Shelford, all of United Kingdom, assignors to Standard Telephone and Cables, Plc, London, England

Filed May 1, 1985, Ser. No. 729,180

Claims priority, application United Kingdom, May 22, 1984, 8413241

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **12 Claims**



1. A cable including an optical fibre which is hermetically sealed within a member formed from one or more ribbons comprised of a metallic glass serving to prevent exposure of the optical fibre to hydrogen gas present in the cable.

4,696,544

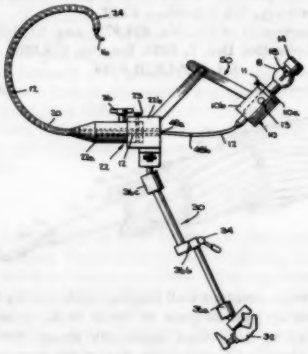
FIBERSCOPIC DEVICE FOR INSPECTION OF INTERNAL SECTIONS OF CONSTRUCTION, AND METHOD FOR USING SAME

James G. Costella, Suffolk County, N.Y., assignor to Olympus Corporation, Lake Success, N.Y.

Filed Nov. 18, 1985, Ser. No. 799,005

Int. Cl.[4] G02B *23/26*; A61B *1/00*; G01N *21/16*; B25J *1/00*

U.S. Cl. 350—96.26 **21 Claims**



1. A device for inspecting interior sections of a construction, said device comprising the combination of

a guide control body having a bore therethrough, a hollow, flexible guide insertion tube extending from said guide control body, and means to articulate at least a distal end portion of said flexible guide insertion tube remote from said guide control body;

a fiberscope including a body, an elongated probe, and means for illuminating and transmitting images of at least a portion of said interior, wherein said fiberscope probe is inserted through said guide control body and said hollow guide insertion tube; and

means to move said fiberscope body selectively toward and away from said guide control body to displace said fiberscope probe relative to said guide control body and said hollow guide insertion tube, whereby said means to articulate said hollow, flexible guide insertion tube and said means to move said fiberscope body are used selectively from the exterior of said construction to aim and control said fiberscope probe within said construction.

20. A method for inspecting interior sections of a construction comprising the steps of

inserting a fiberscope probe through a guide control body and a flexible guide insertion tube extending from said guide control body, at least said guide control body and said flexible guide insertion tube including means to articulate at least a distal end portion of said guide insertion tube,

inserting said fiberscope probe and guide insertion tube into the interior of said construction, and

manipulating at least one of said fiberscope probe and said guide insertion tube, including selectively articulating said guide insertion tube to aim said fiberscope probe from the exterior of said construction and axially displacing said fiberscope probe relative to said guide insertion tube, to direct said fiberscope probe in a desired direction within said construction.

4,696,545

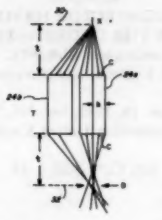
SHORT FOCAL LENGTH IMAGING DEVICE

William L. Lama, and Michael E. Harrigan, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 15, 1985, Ser. No. 765,748

Int. Cl.[4] G02B *27/00*; G03B *27/00*

U.S. Cl. 350—167 **1 Claim**



1. A short focal length imaging device for forming an erect 1:1 image of an object at an object plane on a photosensitive image plane, said device comprising a noble metal photosensitive glass having formed on the surfaces a plurality of raised spherical lenses, said imaging device having a vertex distance t defined by the expression:

$$t = \frac{T}{(n-1)cT - 2n}$$

where T is the device thickness, n is the refractive index of the glass and c is the curvature of each lens of the array and wherein the aperture of each lens of the array has an optimum radius h_{opt} given by

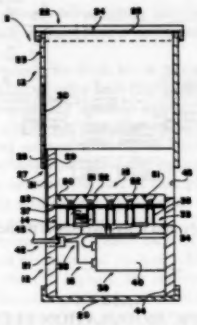
$$h_{opt} = \left[\frac{0.61\lambda(n-1)^2/n}{\left(\frac{1}{t} + \frac{2}{T}\right)^2 \left(\frac{n}{t} + \frac{2}{T}\right)} \right]^{\frac{1}{4}}$$

where λ is the optical wavelength.

4,696,546
EXAMINING APPARATUS

Daryl H. Hodges, P.O. Box 1273, Big Timber, Mont. 59011

Filed May 22, 1986, Ser. No. 865,805
Int. Cl.[4] G02B 27/02
U.S. Cl. 350—235 19 Claims



1. Examining apparatus including a base portion, a telescoping portion, an illuminating portion, a power supplying portion and a specimen displaying portion; said base portion including a bottom section and a first sidewall section extending upwardly therefrom; said telescoping portion including a top section and a second sidewall section extending downwardly therefrom, said top section including a magnifying lens, said second sidewall section being of a size and configuration to provide adjustable overlapping engagement with said first sidewall section of said base portion, means disposed between overlapping surfaces of said first and second sidewall sections maintaining the positioning therebetween; said illuminating portion including a first support member disposed within said base portion substantially parallel to said bottom section and spaced therefrom, said support member including a plurality of spaced first openings, a light emitting diode lamp disposed within each first opening; said power supplying portion including circuitry connecting said light emitting diode lamps electrically with a power source, means for actuating said lamps, said circuitry being selectively engageable with said illuminating portion; said specimen displaying portion including a second support member disposed within said base portion and resting on said illuminating portion, said second support member having major surfaces of the same general configuration as those of said first support member, said second support member including a plurality of spaced second openings, one of said second openings being aligned over each of said light emitting diode lamps of said illuminating portion, each of said second openings in said second support member including a converging conical section; whereby specimens positioned in said conical sections of said displaying portion can be examined through said magnifying lens as illuminated by said lamps disposed therebelow.

4,696,547
WINDOW FOR SHIELDED ENCLOSURE

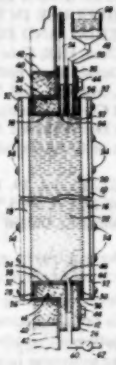
Richard E. Sims, Arlington Heights, Ill., assignor to The Curran Company, Addison, Ill.

Filed Nov. 13, 1985, Ser. No. 797,708
Int. Cl.[4] G02B 5/24, 5/28
U.S. Cl. 350—319 10 Claims

1. A radio frequency shielded enclosure comprising wall means enclosing an electromagnetic radiation shielded space, said wall means including a substantially continuous metal shield, a window opening in said wall means, and an electrically conductive window in the opening for blocking radio frequency electromagnetic radiation while passing visible light;

said window including a continuous frame fastened to said wall means and including electrically conductive means in electrical contact with the metal shield;

a first light transmitting panel attached to said frame facing



toward the shielded space, and a second light transmitting panel spaced from said first panel and attached to said frame facing away from the shielded space;

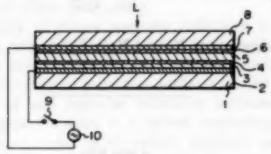
said frame and panels defining an enclosed window space; and

an electrolyte in said window space in electrical contact with said conductive means.

4,696,548
ANTIGLARE MIRROR FOR AN AUTOMOBILE

Yoshiki Ueno, Okazaki; Takasi Taguchi, Anjo, and Tadashi Hattori, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Jun. 7, 1985, Ser. No. 742,525
Claims priority, application Japan, Jun. 8, 1984, 59-118878; Aug. 29, 1984, 59-181561
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—338 15 Claims



1. An antiglare mirror arrangement for an automobile, comprising:

a metal layer for reflecting incident light;

a liquid crystal layer positioned such that incident light must travel therethrough before striking said metal layer, the transparency of said liquid crystal layer being variable by an electric field applied to said liquid crystal layer for preventing glare;

a first TiO_2 transparent dielectric layer also positioned such that incident light must travel therethrough before striking said metal layer, said first dielectric layer being supported by a glass substrate and having a higher refractivity than that of said liquid crystal layer and a selected thickness, so that light reflecting from said mirror and passing

through said first dielectric layer has desired color characteristics.

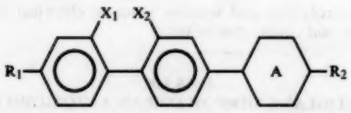
4,696,549

COMPOUNDS CONTAINING A FLUOROBIPHENYLYL GROUP AND THEIR USE IN LIQUID CRYSTAL MATERIAL AND DEVICES

Lawrence Kam Ming Chan, Hull; George W. Gray, Cottingham; Kenneth J. Toyne; David Lacey, both of Hull, all of England; Rudolf Eidenschink, Münster, and Michael Römer, Rodgau, both of Fed. Rep. of Germany, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Division of Ser. No. 632,322, Jul. 19, 1984, Pat. No. 4,594,465.
This application Dec. 5, 1985, Ser. No. 804,741
Claims priority, application United Kingdom, Jul. 22, 1983, 8319849
Int. Cl.[4] C09K 19/12; G02F 1/13
U.S. Cl. 350—350 R 8 Claims

1. A liquid crystal device including two dielectric substrates at least one of which is optically transparent, a layer of liquid material sandwiched between the substrates and electrodes on the inner surfaces of the substrates to enable an electric field to be applied across the layer of liquid crystal material to provide an electro-optical effect therein, characterized in that the liquid material is a mixture of compounds at least one of which is a compound having the formula:



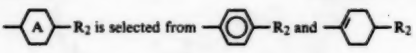
wherein:

R_1 is selected from alkyl, alkoxy, and alkylcarbonyl;

R_2 is selected from alkyl and alkoxy;

X_1 is selected from H and fluorine;

X_2 is selected from H and fluorine; and



provided that one of X_1 and X_2 is fluorine.

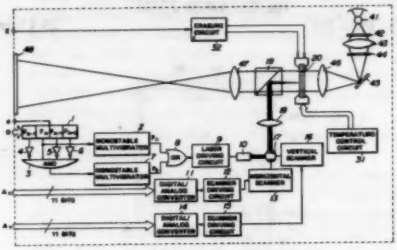
4,696,550

INTENSITY CONTROL OF EXCITATION MEANS OF THERMALLY ADDRESSED DISPLAY

Toshio Shionoya, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,611
Claims priority, application Japan, Dec. 29, 1984, 59-278509
Int. Cl.[4] G02F 1/137
U.S. Cl. 350—351 8 Claims

1. A liquid crystal display apparatus in which writing into the liquid crystal cell is done with a laser beam, comprising decision means for deciding that writing is to be done in a spot in a liquid crystal cell corresponding to a picture element wherein writing did not occur in any of the immediately adjacent spots and for deciding the amount of energy supplied to said spot, and means responsive to the output of said decision means for increasing the amount of the energy supplied to the spot in which the writing is to be done said decision means takes into consideration that writing will not occur on only the



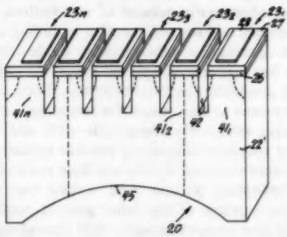
one spot immediately and only two spots immediately succeeding said spot.

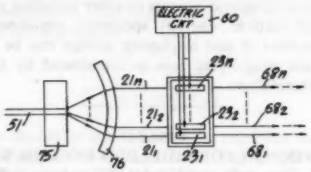
4,696,551

ACOUSTOOPTIC MODULATION ELEMENT AND SYSTEM FOR ACOUSTOOPTICALLY CARRYING OUT MODULATION, OF A PLURALITY OF PARALLEL BEAMS BY THE USE OF A SINGLE ACOUSTOOPTIC MEDIUM

Satoru Amano, Nirasaki; Shigenori Horiuchi, and Takeru Shinohara, both of Yamanashi, all of Japan, assignors to Hoya Corporation, Tokyo, Japan

Division of Ser. No. 517,346, Jul. 26, 1983, Pat. No. 4,592,621.
This application Sep. 23, 1985, Ser. No. 778,786
Claims priority, application Japan, Jul. 27, 1982, 57-129656; Jul. 27, 1982, 57-129657; Jul. 27, 1982, 57-129658; Jul. 27, 1982, 57-129659
Int. Cl.[4] G02F 1/33; G02B 5/18
U.S. Cl. 350—358 6 Claims





1. An acoustooptic modulation system responsive to a single incident beam and a plurality of electric signals for producing output light beams, said acoustooptic modulation system comprising:

a grating member for diffracting said incident light beam into a plurality of diffracted light beams; and

a single acoustooptic modulation element responsive to said plurality of the diffracted light beams as input light beams

for acoustooptically modulating said input light beams in response to said electric signals to produce said output beams determined by said electric signals.

2. An acoustooptic modulation system responsive to a single incident beam and a plurality of electric signals for producing output light beams, said acoustooptic modulation system comprising:

beam splitting means for splitting said incident light beam into a plurality of light beams substantially parallel to one another;

a single acoustooptic medium block having a first surface, a second surface opposite said first surface, and a plurality of plateaus which are equal in number to said input light beams and which are arranged in parallel between said first and said second surfaces so that a channel is left between two adjacent plateaus, each of said input light beams being incident on one of said plateaus at said first surface while said output light beams exit from said plateaus at said second surface; and

a plurality of transducing means each of which is mounted on one of said plateaus and each of which is responsive to one of said electric signals, for individually transducing each said electric signal into an acoustic wave which is propogated into one said plateau to cause the output light beams at said second surface to be modulated by said acoustic waves when said electric signals are applied to the respective transducing means.

4,696,552

PROJECTION DEVICE WITH REFRACTIVE INDEX DISTRIBUTION TYPE LENS

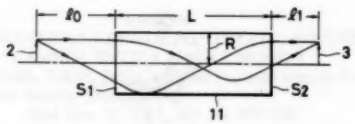
Jun Hattori, Yokohama, and Shigeyuki Suda, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 767,868, Aug. 21, 1985, abandoned. This application Jun. 26, 1986, Ser. No. 879,504

Claims priority, application Japan, Aug. 28, 1984, 59-178580; Feb. 22, 1985, 60-34784

Int. Cl.[4] G02B *3/00, 5/14*

U.S. Cl. 350—413 **11 Claims**



1. A projection device having:

an illuminating system for illuminating an object; and

an index distribution type lens for projecting the image of said object, said lens having a refractive index distribution substantially proportional to the square of the distance from the optic axis in a cross-section perpendicular to the optic axis and a refractive index distribution monotonously varying in the direction of the optic axis.

4,696,553

ZOOM LENS HAVING A LARGE ZOOM RATIO

Sadahiko Tsuji, Kanagawa; Sadatoshi Takahashi, Tokyo, and Kazuo Fujibayashi, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha

Filed Mar. 3, 1983, Ser. No. 471,839

Claims priority, application Japan, Mar. 4, 1982, 57-34206; Mar. 9, 1982, 57-37435; Mar. 23, 1982, 57-45778; Mar. 23, 1982, 57-45779; Apr. 15, 1982, 57-62851

Int. Cl.[4] G02B *15/20*

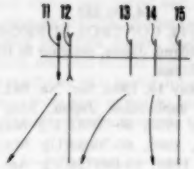
U.S. Cl. 350—427 **11 Claims**

1. A zoom lens comprising:

at least four lens groups,

said four lens groups including, from front to rear, a first lens group which has a positive refractive power, and a second lens group which has a negative refractive power and is composed of a negative lens having a concave surface directed toward the image and a cemented lens of a bi-concave lens and a bi-convex lens,

wherein zooming is performed by moving said first lens group and at least one of the lens groups which are arranged on the image side of said second lens group independently of each other and said second lens group is fixed during zooming; and



the image magnification of said second lens group is made to include unity of image magnification.

4,696,554

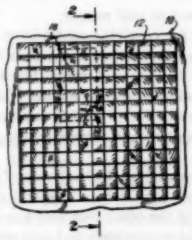
METHOD AND APPARATUS FOR PROVIDING A VARIABLE MULTIPLE IMAGE VISUAL EFFECT

James Seawright, 155 Wooster St., New York, N.Y. 10012

Filed Jun. 28, 1985, Ser. No. 750,687

Int. Cl.[4] G02B *5/08, 5/10, 5/124, 7/18*

U.S. Cl. 350—613 **33 Claims**



1. A visual display apparatus for providing a variable multiple image visual effect comprising:

a first plurality of planar specular reflective surfaces disposed in a pseudo spherical optical array, said array having a first common center of curvature associated with said first plurality of reflective surfaces and an array center, each of said specular reflective surfaces having a center disposed normal to a radius emanating from said first common center of curvature, whereby each of said planar specular reflective surfaces is disposed tangent to the pseudo spherical optical array pseudo spherical surface, said pseudo spherical optical array having a focal point disposed at said first common center of curvature; and a mounting means for each of said plurality of specular reflective surfaces, each of said specular reflective surfaces being mounted in said array for providing multiple substantially identical reflected visual images of an object disposed at said focal point in front of said array and progressively shifted images from said object as said object to be reflected shifts orthogonally from said focal point, said array providing a pair of orthogonally displaced conjugate foci for said orthogonally shifted object, said pair of conjugate foci being symmetrically displaced from said focal point, said focal point being substantially disposed at the height of said array center, said array center being substantialy disposed at eye level, whereby a

multiple image spherical reflector visual effect capable of providing multiple progressively related reflected visual images of an object in said array is provided from a plurality of planar reflective surfaces.

4,696,555

ELECTRIC REMOTE CONTROL MIRROR APPARATUS

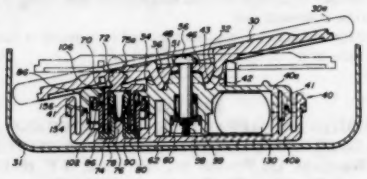
Masao Enomoto, Hadano, Japan, assignor to Ichikoh Industries Limited, Tokyo, Japan

Filed May 14, 1986, Ser. No. 862,960

Claims priority, application Japan, May 14, 1985, 60-70080[U]; May 14, 1985, 60-70081[U]; May 14, 1985, 60-70082[U]; May 14, 1985, 60-70083[U]; May 27, 1985, 60-77628[U]; Apr. 4, 1986, 61-049756[U]; Apr. 14, 1986, 61-054722[U]; Apr. 14, 1986, 61-054723[U]

Int. Cl.[4] B60R *1/02*; G02B *7/18*

U.S. Cl. 350—634 13 Claims



1. An electric remote control mirror apparatus comprising:

a mirror,

a mirror body fixed to said mirror,

a mirror housing for receiving said mirror body,

supporting means fixed within said mirror housing for holding said mirror body in said mirror housing, said supporting means including a housing member fixed in said mirror housing and means for pivotably supporting said mirror body and connecting said mirror housing with said housing member,

two ball bases mounted on the back side of said mirror body wherein one ball base lies on a lateral pivot axis of said mirror body and the other ball base lies on a longitudinal pivot axis of said mirror body and said laterial and longitudinal axes are perpendicualr to one another,

a pair of hollowed cylindrical threaded rods each of which has an inner surface provided with screw threads and a ball portion at the end portion of said each threaded rod, said ball portion being adapted to be fitted to each of said ball bases respectively, and said pair of the hollowed cylindrical threaded rods being disposed in said ball bases, and each of said pair of hollowed cylindrical threaded rods being movable in its axial direction through a cylindrical hole mounted on said housing member, but each of said pair of hollowed cylindrical threaded rods being unrotatable with respect to said housing member,

a pair of rotation members rotatably mounted in said housing member, each of said rotation members having at least two portions having a plurality of screw threads, said two portions spaced apart from each other and said plural screw threads being coupled to said screw threads of each of said threaded rods,

gear means connected to each of said rotation members for transmitting a driving force to each of said rotation members,

electric motor means for driving said rotation member through said gear means, and

resilient O-rings fixedly disposed in said housing member and contacting the respective outer surfaces of said threaded rods, such that each threaded rod is supported by said housing member.

4,696,556

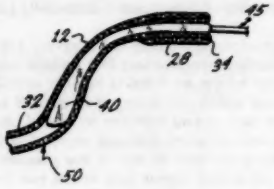
EYEGLASS RETAINER

Charles D. Perry, III, 14612 Larch, Lawndale, Calif. 90260

Filed May 6, 1985, Ser. No. 731,114

Int. Cl.[4] G02C *5/14*, *3/00*

U.S. Cl. 351—157 14 Claims



1. An eyeglass retainer headband comprising a substantially continuous tube of pliable textile material having a normal inner diameter between two open ends, a segment of said tube at each said end being turned into said tube to form a double walled end portion of somewhat reduced inner diameter in relation to said normal diameter and increased stiffness for securely gripping the ends of eyeglass frame temple pieces inserted into said folded end portion while also providing a smoothly contoured folded edge around each end opening of the tube.

4,696,557

COLLAPSIBLE OVERHEAD PROJECTOR

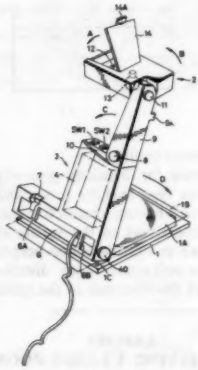
Mitsuo Tomizuka, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 23, 1986, Ser. No. 888,374

Claims priority, application Japan, Jul. 31, 1985, 60-169339

Int. Cl.[4] G03B *21/16*

U.S. Cl. 353—66 14 Claims



1. An overhead projector comprising:

a base supporting a lens and serving as a document table;

a main projector body pivotally supported on said base by a first hinge means and formed as a substantially L-shaped box as viewed in elevation so as to define a recess;

a post arm pivotally supported on said main projector body by a second hinge means extending at a right angle to said first hinge means;

a head pivotally supported on said post arm by a third hinge means extending parallel with said first hinge means and having a mirror and a light source, said head being held in confronting relation to said base when the overhead projector is in use;

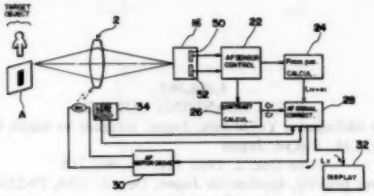
wherein said first hinge means is at the bottom of said L-shaped box and at one side of said base so that said base, said main projector body, said post arm, and said head are collapsible into a combined assembly with said head housed in said recess of said L-shaped box.

4,696,558

FOCUS CONDITION DETECTING ARRANGEMENT

Toshihiko Karasaki; Toru Matsui, both of Sakai, and Hiroshi Ueda, Habikino, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 8, 1986, Ser. No. 916,620
Claims priority, application Japan, Oct. 11, 1985, 60-227092
Int. Cl.[4] G03B *3/00*
U.S. Cl. 354—406 **5 Claims**



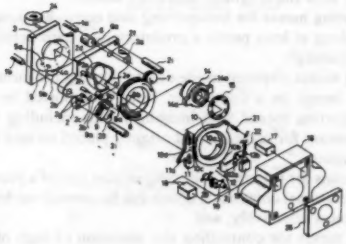
1. A focus condition detecting arrangement for use in a photographic camera, which comprises a focus condition detecting device including photo-sensor means having sensitivity with respect to a visible light and an infrared light from a target object to be photographed and adapted to produce a focus condition detection signal based on the output of the photo-sensor means, a contrast detecting means for detecting contrast of said target object with respect to the respective lights, and a correcting means for correcting the focus condition detection signal based on an output of said contrast detecting means, so that a corrected focus condition detection signal representing the focus condition with respect to the visible light is obtained.

4,696,559

VARIABLE FOCAL LENGTH, AUTOMATIC FOCUSING CAMERA WITH A SINGLE MOTOR

Shigeru Kondo, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1985, Ser. No. 800,259
Claims priority, application Japan, Nov. 27, 1984, 59-251321
Int. Cl.[4] G03B *3/08, 9/08*
U.S. Cl. 354—403 **5 Claims**



1. An automatic focusing barrel lens unit for attachment to a camera body for movement towards and away from said body, comprising:

means of aligning an optical axis of said barrel unit with a photographic axis of said camera;

a main lens system disposed in said barrel unit along said optical axis;

first means, disposed within said barrel unit, for moving at least a part of said main lens system along said optical axis for focusing said main lens system;

an automatic focusing mechanism, disposed within said barrel unit, for controlling said first means and including a mechanical scanning mechanism;

a shutter mechanism, disposed within said barrel unit, for controlling the passage of light along said optical axis;

a motor disposed within said barrel unit;

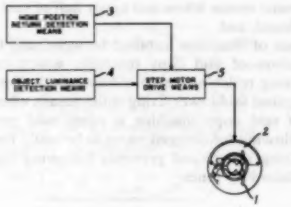
second means, disposed entirely within said barrel unit operatively engaging said first means, said mechanical scanning mechanism, and said shutter mechanism and mechanically driven solely by said motor for providing sole mechanical power from said motor to said first means, said mechanical scanning mechanism and said shutter mechanism.

4,696,560

CAMERA SHUTTER

Masuo Ogihara; Hajime Oda; Yoichi Seki, and Hiroshi Yamazaki, all of Yotsukaido, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed May 6, 1985, Ser. No. 730,743
Claims priority, application Japan, May 9, 1984, 59-92183
Int. Cl.[4] G03B *7/08*
U.S. Cl. 354—439 **14 Claims**



1. A camera shutter comprising: a shutter mechanism body including a sector defining a lens aperture to be opened and closed, a forwardly/reversely rotatable step motor for driving the sector to open and close the lens aperture, and a control unit having home position return detection means for detecting whether or not said sector is positioned in a home position; object luminance detection means for outputting a signal corresponding to an object luminance; and motor driver means for rotating said step motor in forward and reverse directions in a rotational quantity according to the signal from said object luminance detection means and reversely rotating said step motor when said home position return detection means detects that said sector is not positioned in the home position before and after an exposure operation of the shutter mechanism body.

4,696,561

FIXING ROLLER PRESSING MECHANISM FOR COPYING MACHINES

Tutomu Katoh, and Hiranaga Yamamoto, both of Yamatokoriyama, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 15, 1986, Ser. No. 819,101
Claims priority, application Japan, Jan. 22, 1985, 60-7799[U]
Int. Cl.[4] G03G *15/20*
U.S. Cl. 355—3 FU **3 Claims**

1. A fixing-roller pressing mechanism for a copying machine having an upper and lower half comprising:

a fixation unit including upper and lower fixing roller means:

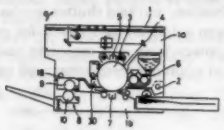
a projecting wall means which projects upward from said lower half of said copying machine;

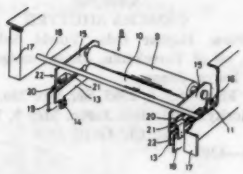
lower frame members pivotally held to said projecting wall

means and supported by a compression means so that said lower frame member can move in a vertical direction, said lower frame member supporting said lower fixing roller means;

upper frame members pivotally held to said projecting wall means above said lower frame members, said upper frame members supporting said upper fixing roller means;

pressure member installed in said upper half of said copying machine, which causes said upper fixing roller means to press against said lower fixing roller means via said upper





frame means when said upper half of said copy machine is closed; and

means of retention installed between said lower and upper halves of said copy machine, which cause said upper fixing roller means to remain in a half-pressed condition against said lower fixing roller means when said upper half of said copy machine is open, said pressing condition allowing for clogged paper to be easily removed from said fixing rollers and prevents following copies from being stained by toner.

4,696,562

MULTIFUNCTIONAL COPYING MACHINE

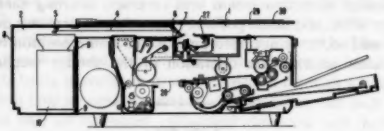
Yoshihito Urata, Katano; Masaichiro Tatekawa, Sakai, and Toshiharu Sasaki, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jun. 18, 1985, Ser. No. 746,112

Claims priority, application Japan, Jun. 18, 1984, 59-125645; Jun. 18, 1984, 59-125647

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 R **6 Claims**



1. A multifunctional copying machine comprising:

an electro-photographic copying unit having: a housing; a document table on said housing for supporting thereon a document to be copied; a photosensitive body within said housing; an exposure means within said housing for forming on a surface of said photosensitive body an electrostatic latent image corresponding to an image on the document; developing means within said housing for developing the electrostatic latent image with a toner; and transfer means within said housing for transferring the developed image onto a transfer sheet positioned sequentially around said photosensitive body; said copying unit having an unobstructed space extending along said document table below said document table and having one end opening to the outside of said housing and the other end having an opening between said space and said photosensitive body;

a laser scanning unit detachably attached to said copying unit on the exterior of said housing for producing a laser beam for scanning said surface of said photosensitive body; and

guide means for guiding said laser beam from outside said copying unit into said one end of said space and through said space below said document table and through said opening to said photosensitive body.

4,696,563

SPLIT SCANNING COPIER

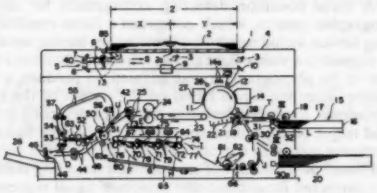
Mitsuo Shibusawa, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 2, 1985, Ser. No. 803,718

Claims priority, application Japan, Dec. 3, 1984, 59-254166

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 **12 Claims**



1. A copying apparatus comprising:

a housing;

holding means provided on said housing for holding thereon stationarily an original to be copied, said holding means having a first scanning range and a second scanning range in a side-by-side relation;

storing means for storing a quantitY of copy sheets;

detecting means for detecting the size of said copy sheets stored in said storing means, said detecting means detecting at least the length of said copy sheets;

transporting means for transporting said copy sheets one by one along at least partly a predetermined path defined in said housing;

imaging means disposed inside of said housing for forming a copy image on a copy sheet being transported by said transporting means, said imaging means including scanning means for scanning said original placed on said holding means;

input means for manually inputting at least one of a plurality of operational commands which can be carried out by said apparatus selectively; and

control means for controlling the operation of each of said transporting means and said imaging means in accordance with said at least one operational command input by said input means, said control means having means for determining a range of scanning movement of said scanning means for a predetermined reference position in registry with at least one of said first and second scanning ranges on said holding means selectively in accordance with the length of said copy sheets detected by said selecting means.

4,696,564

IMAGE FORMING APPARATUS

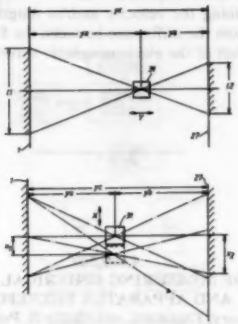
Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 9, 1986, Ser. No. 883,728

Claims priority, application Japan, Jul. 11, 1985, 60-153068; Aug. 16, 1985, 60-180214

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 R 20 Claims



1. An image forming apparatus comprising:

detection means for detecting a presence of a copy paper and determining an offset amount of said copy paper from a prescribed position in a direction perpendicular to a feeding direction of said copy paper;

scan means for optically scanning an original document;

visible image forming means for forming a document image corresponding to said original document scanned by said scan means as a visible image on said copy paper; and

image moving means for moving said visible image, in said direction perpendicular to a feeding direction of said copy paper, formed on said copy paper by said visible image forming means on the basis of said determination of said detection means.

4,696,565

CLEANING DEVICE FOR A MONOCHROMATIC COPYING MACHINE

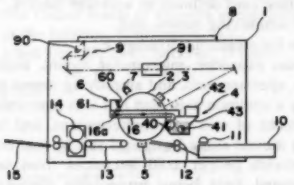
Yoshiaki Imanaka, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 3, 1986, Ser. No. 881,788

Claims priority, application Japan, Jul. 5, 1985, 60-148792

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—15 1 Claim



1. A cleaning device for a monochromatic copying machine for processing residue toner removed ty a blade assembly from a photoreceptor, said copying machine being of a type capable of accommodating selectively a plurality of developer boxes containing respective masses of toner of different colors, which device comprises:

a toner recovery duct extending between a cleaning box, adapted to accommodate therein residue toner removed from the photoreceptor, and a developer box, for feeding the residue toner accommodated within the cleaning box towards the developer box, one of said developer boxes for use with the mass of black-colored toner having a single chamber defined therein, said chamber being communicated with the toner recovery duct when said developer box is set in position within said copying machine, each of the remaining developer boxes for use with masses of toner respective colors other than black having working and collecting chambers defined therein, separated by a partition wall from each other, said collecting chamber being communicated with the other recovery duct when any one of said remaining developer boxes is set in position within said copying machine.

4,696,566

THREE-DIMENSIONAL DRIVING ARRANGEMENT

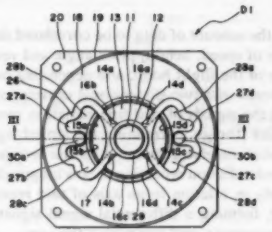
Yoshihiro Sekimoto; Shigeo Terashima, both of Tenri, and Kunio Kojima, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 1, 1985, Ser. No. 697,465

Claims priority, application Japan, Feb. 8, 1984, 59-22493; Feb. 8, 1984, 59-22494; Apr. 13, 1984, 59-75544; Apr. 13, 1984, 59-75545

Int. Cl.[4] G11B *7/12*

U.S. Cl. 350—255 1 Claim



1. A three-dimensional driving arrangement for an objective lens, which comprises an objective lens support member having an objective lens provided at a central portion thereof, a driving means for driving said objective lens support member vertically and horizontally in three directions, and elastic members respectively provided at upper and lower portions of the objective lens support member for movably supporting said support member and for effecting damping action in the respective vertical and horizontal directions, said elastic members being reduced in thickness in the vertical direction and each formed, in a top plan view thereof, generally into a shape of a figure eight provided with constricted portions respectively in the two horizontal directions.

4,696,567

RADIATION DETECTION METHOD

James Ruger, Hoffenheim, and Wolfgang Welz, Bammental, both of Fed. Rep. of Germany, assignors to Eltro GmbH, Heidelberg, Fed. Rep. of Germany

Filed Nov. 19, 1984, Ser. No. 673,130

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1983, 3344798

Int. Cl.[4] G01P *3/36*

U.S. Cl. 356—28 16 Claims

1. A method of detecting radiation of a moving object from a reconnaissance flight body, comprising the steps of:

flying over the moving object and surrounding scene with the reconnaissance flight body;

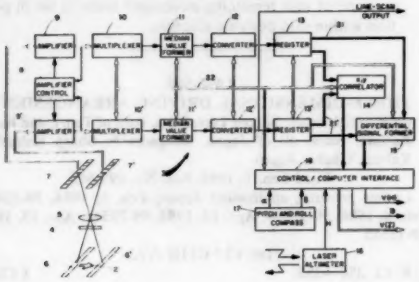
measuring the altitude of the flight body over ground with a laser altimeter, and the pitch angle and roll angle of the

flight body with a compass of the navigational system of the flight body;

during over-flight, first scanning the object and scene with first radiation receiving means;

then scanning the object and scene with a second radiation receiving means offset parallel to and of similar type than said first receiving means;

said first and second radiation receiving means being respectively a serial arrangement of first and second receiving elements;



setting the amount of data to be correlated depending on the range of speed, height, pitch angle and resulting slide slip angle of the flight body, and depending on a target speed by means of a two-dimensional correlation window;

placing the signals of said first radiation receiving means in parallel storage, correlating the stored signals of the first radiation receiving means with the arriving signals of the second radiation receiving means longitudinally and transversely in relation to an axis of said reconaissance flight body, forming a differential signal signature, registering said signature, and evaluating the same.

4,696,568

METHOD OF AND APPARATUS FOR MEASURING THE VELOCITY AND/OR THE LENGTH OF MOVING OBJECTS

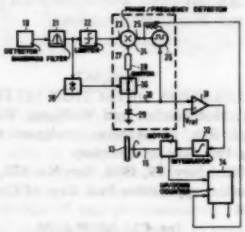
Marten P. Weistra, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 11, 1984, Ser. No. 609,244

Claims priority, application Netherlands, May 31, 1983, 8301917

Int. Cl.[4] G01P *3/36*

U.S. Cl. 356—28.5 **19 Claims**



1. A method of measuring the velocity and/or length of a moving object in accordance with the Doppler principle comprising the following steps:

(1) generating an electromagnetic wave having a given fixed frequency,

(2) preshifting the electromagnetic wave to obtain at least one frequency shifted or phase modulated electromagnetic wave,

(3) directing the preshifted electromagnetic wave towards the moving object,

(4) adjusting the degree of preshift of said electromagnetic wave in a sense such that the algebraic sum of a frequency preshift and a Doppler shift produced by motion of the object is constant, whereby said Doppler shift has a predetermined fixed frequency, and

(5) determining the velocity and/or length of the moving object from the difference between the Doppler shift and the preshift of the electromagnetic wave.

4,696,569

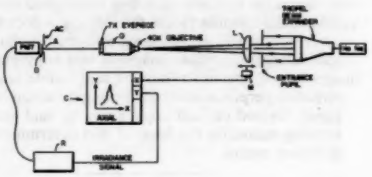
METHOD OF MEASURING SPHERICAL ABERRATION AND APPARATUS THEREFOR

Joseph M. Geary, Edgewood, and Phillip R. Peterson, Albuquerque, both of N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 11, 1985, Ser. No. 721,968

Int. Cl.[4] G01B *9/00*

U.S. Cl. 356—124 **4 Claims**



1. An apparatus for measurement of spherical aberration of a test lens, comprising:

a beam expander,

a micrometer-mount for said test lens,

a means for moving said test lens longitudinally along its optical axis,

a microscope,

a diffuser,

an aperture card defining an aperture therein,

a photo-amplifying means, and

a means for measuring irradiance,

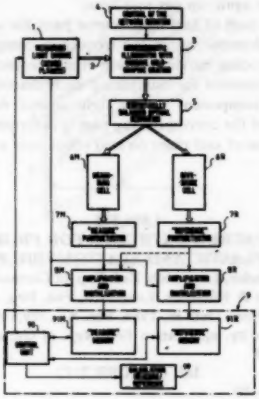
said beam expander, micrometer mount, microscope, diffuser, aperture card, and amplifying means being aligned along a common axis, said test lens placeable in said axis by means of said micrometer-mount, and said test lens being moved along its optical axis by said moving means to provide proper axial intensities from said test lens, collimated light being projectable through said beam expander and along said axis and through said aperture to impinge upon said amplifying means, said measuring means receiving and measuring said collimated light from said photo-amplifying means and determining a location of a paraxial focus by measuring light along an optical axis of said test lens, said measuring means determining a location of an actual focus of said test lens by measuring said collimated light in proximity to said paraxial focus, said actual focus and said paraxial focus yielding therefrom the spherical aberration of the test lens.

4,696,570

SPECTROPHOTOMETER WITH STATISTICALLY BALANCED LIGHT FOR VERY HIGH RESOLUTION

A. Pierre Joliot, Antony, and Daniel Beal, Orsay, France, assignors to Centre National de la Recherche Scientifique (C.N.R.S.), Paris, France

Filed Apr. 29, 1985, Ser. No. 728,295
Claims priority, application France, Apr. 23, 1985, 85 06172
Int. Cl.[4] G01J *3/42*
U.S. Cl. 356—319 **15 Claims**



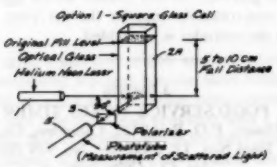
1. A differential spectrophotometer, comprising two sample locations, optical means for applying to the two samples monochromatic measuring light, photodetectors for selectively collecting the light transmitted through each one of the two samples, and electronic means for comparing the quantities of transmitted light thus measured by the two photodetectors, said optical means distributing the measuring light statistically balanced to the two samples and including a flash source illuminating an inlet slit diaphragm of a monochromator with a concave holographic grid, a parallelepipedic light guide optically coupled to an outer slit diaphragm of the monochromator and followed by a Y-shaped guide of optical fibers where the optical fibers are substantially randomly distributed between two branches of the Y providing the statistical balanced light.

4,696,571

SUSPENDED SEDIMENT SENSOR

Marvin C. Goldberg, Englewood; Kirkwood M. Cunningham, Lakewood, and Eugene R. Weiner, Denver, all of Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 25, 1985, Ser. No. 791,286
Int. Cl.[4] G01N *15/02*
U.S. Cl. 356—336 **5 Claims**



1. An apparatus for simultaneously measuring particle mass and size of suspended sediment in liquids comprising:

means for holding a sample of liquid having sediment of a size between 5 and 50 microns suspended therein to be measured, said sediment size being large enough to cause immediate settling of said sediment under the mere influence of gravity, undisturbed by convection flows or external forces, said holding means containing said sample of liquid;

light surce means for producing laser light beam polarized in a predetermined plane and directing said laser light beam through said sample holding means during at least a portion of the time that said sediment is settling;

photodetector means disposed at an approximately 90° angle with respect to said laser light beam for detecting the amount of light from said light source means passing through said sample holding means at said 90° angle; and

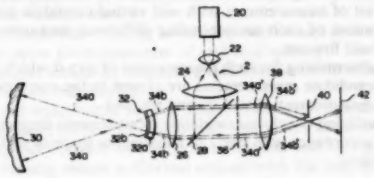
means disposed between said sample holding means and said photodetector means for polarizing the light being detected by said photodetector means in the same plane as the polarization of said laser light beam.

4,696,572

SURFACE INSPECTION APPARATUS

Akira Ono, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 19, 1985, Ser. No. 702,636
Int. Cl.[4] G01B *9/021*
U.S. Cl. 356—348 **33 Claims**



1. A surface inspection apparatus for inspecting the condition of an aspherical subject surface, comprising:

emitting means for emtting a parallel light beam;

a carrier frequency hologram;

light dividing means for dividing the light beam emitted from the emitting means into an object light directed toward the subject surface and a reference light directed toward the hologram;

an optical system for applying the object light at right angles to the subject surface and directing the applied object light toward the hologram; and

selecting means for selectively extracting zeroth-order diffracted rays of the reference light passed through the hologram and Nth-order diffracted rays of the object light passed through the hologram and causing the diffracted rays to interfere with each other,

said hologram being designed so that the Nth-order diffracted rays of the object light have the same wave front as the zeroth-order diffracted rays of the reference light, and having a carrier frequency $f < 3\text{-}\Delta f$, where Δf represents the maximum frequency bandwidth of the transmitted rays of the object light,

wherein the condition of the subject surface is judged from interference fringes of the diffracted rays which are caused to interfere with each other.

4,696,573

DUAL SHEAR WAVEFRONT SENSOR

Richard A. Hutchin, Marlboro, Mass., assignor to Itek Corporation, Lexington, Mass.

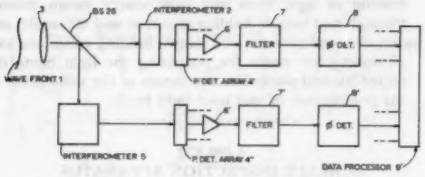
Filed Jul. 3, 1985, Ser. No. 751,633
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—353 **16 Claims**

1. A method of measuring a given wavefront of light with a

first shearing interferometer having a given shear and dynamic range, and with a second interferometer having a relatively small shear with respect to said given shear and having a relatively large dynamic range comprising the steps of:

a. directing most of said light of said wavefront to said first interferometer and at least a portion of the remaining light of said wavefront to said second interferometer;

b. utilizing said first interferometer to produce a first set of phase difference measurements having values indicative of wavefront slopes, each measurement of said first set having a plurality of virtual candidate measurements due to measurement ambiguity produced by said large shear;



c. utilizing said second interferometer to produce a second set of phase difference measurements having values indicative of wavefront slopes;

d. comparing each difference measurement of said second set of measurements with said virtual candidate measurements of each corresponding difference measurement of said first set;

e. determining for each measurement of step d which of said candidate measurements are closest to the corresponding measurement of said second set; and

f. utilizing the closest candidate measurements determined in accordance with step e to measure the shape of said wavefront.

4,696,574

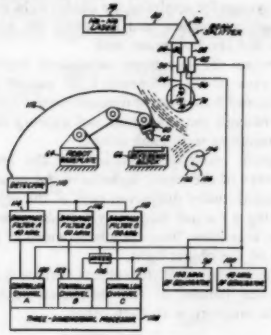
PRECISION REMOTE LOCATION OF A MOVABLE POINT EMPLOYING LIGHT INTERFERENCE FRINGES

Carl M. Penney, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 622,906, Jun. 21, 1984, abandoned. This application Aug. 21, 1986, Ser. No. 898,565

Int. Cl.[4] G01B *11/14;* **B25J** *19/00*

U.S. Cl. 356—375 **4 Claims**



1. A system for determining the change in position of a point on a robot, comprising:

at least three spaced coherent light sources having predetermined difference frequencies and constituting a defined number of light source pairs, the sources of each light source pair having a unique difference frequency, and each light source pair projecting throughout a working volume of at least one cubic meter a moving pattern of interference fringes which has a known fringe spacing and is independent of the moving pattern of interference fringes from each of the other light source pairs;

a single filament fiber optic whose tip is located at said point on said robot, which is movable anywhere within the working volume, and senses instantaneous illumination;

said fiber optic being coupled to a photodetector that provides a detector signal having, for each of the moving patterns of interference fringes, a frequency component determined by the number of interference fringes crossing said fiber optic tip per unit time;

a filter for each of said light source pairs for separating out of said detector signal the frequency component of the corresponding moving pattern of interference fringes; and

a signal processor for comparing each detector signal frequency component to the light source difference frequency of the corresponding pair to determine the change in position of said point on said robot over any time interval.

4,696,575

SINGLE-SCREW EXTRUDER FOR PRODUCING THERMOPLASTIC AND ELASTOMERIC PRODUCTS

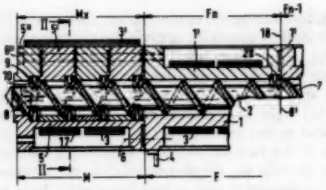
Hartmut Upmeier, Lengerich, Fed. Rep. of Germany, assignor to Windmöller & Hölscher, Lengerich, Fed. Rep. of Germany

Filed Oct. 18, 1985, Ser. No. 789,145

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1984, 3438649

Int. Cl.[4] B29B *7/12*

U.S. Cl. 366—80 **11 Claims**



1. A single-screw extruder for producing thermoplastic and elastomeric products, comprising a hollow cylindrical barrel, which is provided with inwardly protruding mixing elements, and a screw, which is rotatably disposed in the barrel and has a core and at least one helical land on the core said at least one helical land formed with recesses with the mixing elements extending into the helical land recesses, wherein the mixing elements are carried by split carrying rings, which are axially spaced apart by interposed spacing rings, the split carrying rings having on their outside surfaces on both sides of their interfaces axially extending step-shaped recesses which are mirror images of each other, the barrel having a longitudinal recess, and wherein the carrying ring recesses and the barrel recess define grooves for key means which extend into the grooves to non-rotatably support the carrying rings in the barrel when the extruder is assembled.

4,696,576

FOOD SERVICE TICKET TIMER

Frankie A. Moore, P.O. Box 9422, Columbus, Ga. 39108

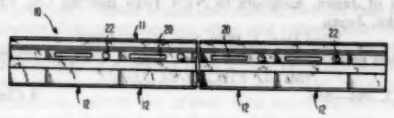
Filed Nov. 12, 1986, Ser. No. 929,732

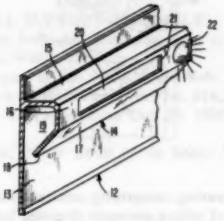
Int. Cl.[4] G04F *8/00*

U.S. Cl. 368—10 **1 Claim**

1. A fast service ticket timer, comprising, a control board having a row units, each unit including an electrical timer in a circuit, and means for closing said circuit at a set time after a

meal order has been received, and comprising a timer ticket having said meal order written thereon, and each said unit





being adaptable to receive said ticket, and said ticket closing said circuit.

4,696,577

INTEGRAL WATCH CASE MIDDLE AND MOVEMENT PLATE AND METHOD OF MAKING SAME

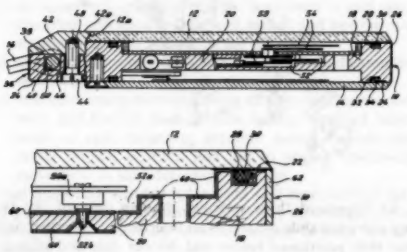
Jacques Müller, Reconvilier, and André Triponez, Lamboing, both of Switzerland, assignors to ETA S.A. Fabriques d'Ebauches, Grenchen, Switzerland

Filed Aug. 27, 1986, Ser. No. 900,924

Claims priority, application Switzerland, Sep. 6, 1985, 03857/85

Int. Cl.[4] G04B *57/00*

U.S. Cl. 368—276 **18 Claims**



1. An integral watch case middle and movement plate made of brass comprising top and bottom faces with at least one formed with recesses for receiving components of a watch movement, and side faces, and provided with a coating made of a material that is chemically more inert than brass, said coating including a first part that protects the brass in the regions of said middle and said plate that are formed with said recesses and a second part that protects the brass at least over said side faces and which is thicker and more resistant to chemical and physical attack than the first part.

4,696,578

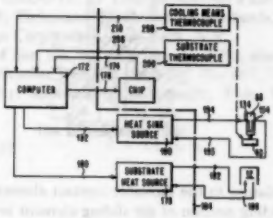
SINGLE CHIP THERMAL TESTER

Mohanlal S. Mansuria, Coral Springs, Fla.; Rolf G. Meinert, Wappingers Falls, N.Y.; Sevgin Oktay, Poughkeepsie, N.Y., and Carl D. Ostergren, Montgomery, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 19, 1986, Ser. No. 876,143

Int. Cl.[4] G01N *25/00*; **G01R** *31/26*

U.S. Cl. 374—45 **24 Claims**



1. An apparatus for precisely measuring the thermal resistance of a heat transfer device for carrying heat away from a semiconductor chip comprising, in combination:

a heat source packaged in a housing having the size and configuration of a semiconductor chip to be cooled by a heat transfer device;

first temperature sensing means disposed on said heat source to sense the temperature of said heat source;

a support means for supporting said heat source in a thermal transfer relationship;

second temperature sensing means disposed to substantially measure the temperature of said heat source at the contact surface between said support means and said heat source;

positioning means in thermal contact with the heat transfer device at one end thereof for positioning the heat transfer device so that its other end is in thermal contact with said heat source so as to provide the desired heat transfer from said heat source to the heat transfer device;

third temperature sensing means disposed substantially at the contact between said positioning means and the heat transfer device;

means for placing the heat transfer device, said heat source, said first temperature sensing means, said support means, said second temperature sensing means, said positioning means and said third temperature sensing means in substantially a vacuum; and

means to adjust the temperature of said support means, said heat source and said positioning means so that in the steady state heat generated by said heat source only flows through the heat transfer device toward said positioning means thereby making possible a determination of the thermal resistance of the heat transfer device.

4,696,579

THERMOSTAT

Pietro De Filippis; Ciro Calenda, both of Aversa; Giuseppe Notaro, Pomigliano D'Arco, all of Italy, and Henry Boulanger, Nicholasville, Ky., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 30, 1985, Ser. No. 781,619

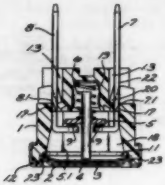
Claims priority, application Italy, Oct. 24, 1984, 49059 A/84

Int. Cl.[4] H01H *37/12, 37/54*

U.S. Cl. 374—187 **6 Claims**

1. A thermostat comprising a monolithic base having a chamber open at one end, two terminals connectable to an electric circuit inserted into the base, each terminal carrying a stationary contact within the base chamber, a movable contact element movable between a position interconnecting the stationary contacts and a position spaced from said stationary contacts, a spring mounted in the base biasing the movable

contact element to one of said positions relative to the stationary contacts, a thermally responsive bimetallic element movable in response to temperature change, a sliding element for moving the movable contact element against biasing of the spring in response to movement of the bimetallic element, and a lid which positions said bimetallic element on said base characterized in that the sliding element is adjustably joined in



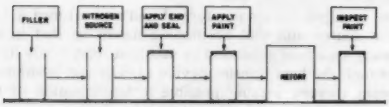
operative relation to the movable contact element for disposing an extending portion of the sliding element with a selected spacing from the movable contact element in a selected position between the movable contact element and the bimetallic element for calibrating the thermostat to move the movable contact element from one of said positions to the other position against biasing of said spring when the bimetallic element moves in response to selected temperature change.

4,696,580

METHOD FOR DETECTING STERILIZATION

Toshinori Kameda, Ibaraki, Japan, assignor to National Can Corporation, Chicago, Ill.

Filed Mar. 3, 1986, Ser. No. 835,692
Claims priority, application Japan, May 16, 1985, 60-102772
Int. Cl.[4] G01K *11/12*; G01N *25/00*
U.S. Cl. 374—162 **7 Claims**



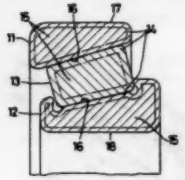
1. A method for detecting sterilization effect applied to a thin wall soft type can, such as aluminum, filled with low acid foods or drinks, which comprises the steps of applying a thermal sensitive paint in the form of descriptions or marks to an exterior surface of said can which is already filled with said low acid foods or drinks and hermetrically sealed off, said thermal sensitive paint having its inherent nature of manifesting a visible color change when exposed to a steam of a predetermined temperature for a predetermined interval which corresponds to desired conditions for retort sterilization treatment to be applied to said low acid foods or drinks; applying said retort sterilization treatment to said low acid foods or drinks contained in said can; and detecting said visible color change of said thermal sensitive paint of said can so that said can with said thermal sensitive paint manifesting no visible color chane is regarded as having been subjected to incomplete retort sterilization.

4,696,581

ROLLING BEARING

Noriyuki Tsushima, Kuwana, and Hirokazu Nakajima, Gifu, both of Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Filed Dec. 2, 1986, Ser. No. 936,860
Claims priority, application Japan, Dec. 3, 1985, 60-273078
Int. Cl.[4] F16C *33/34*, *33/62*
U.S. Cl. 384—565 **1 Claim**



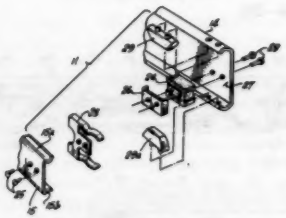
1. A rolling bearing comprising outer and inner bearing rings and a plurality of rolling elements disposed between said inner and outer bearing rings, said bearing rings and said rolling elements being made of carburized steel having an oxygen content of not more than 15 PPM and a carbon content of 0.15 to 0.4 percent, said bearing rings and said rolling elements having a surface hardened layer which has a hardness of not less than 58 in HRC and having a core hardness of not less than 48 and not more than 58 in HRC, the depth of said surface hardened layer being not less than 0.05 for said bearing rings and not less than 0.07 for said rolling elements in terms of depth/diameter of said rolling element.

4,696,582

THREE MEMBER DRAWER SLIDE WITH SEQUENTIAL MOVEMENT

Donald A. Kasten, Pomona, Calif., assignor to Standard precision, Inc., Santa Fe Springs, Calif.

Filed Oct. 27, 1986, Ser. No. 923,210
Int. Cl.[4] F16C *29/04*
U.S. Cl. 384—18 **15 Claims**



1. An improved three member drawer slide of the type having a drawer slide affixed to an intermediate member and a cabinet slide positioned below said drawer slide and affixed to said intermediate member, said drawer slide having a drawer slide outer member, a drawer slide inner member and said drawer slide having a plurality of ball bearings held by an upper ball retainer and said cabinet slide having a cabinet slide outer member, a cabinet slide inner member and a plurality of ball bearings held by a lower ball retainer wherein the improvement comprises means to cause the movement of the lower ball retainer to occur before the movement of the upper ball retainer, said means comprising:

releasable gripping means between said drawer slide outer member and said intermediate member, said releasable gripping means performing a gripping action only when

said drawer slide outer member is fully retracted and said cabinet slide outer member being more free to move outwardly with respect to said intermediate member than said drawer slide outer member when said cabinet slide outer member is retracted whereby when said three member drawer slide is extended from a fully retracted position, the cabinet slide outer member will move outwardly completely before the drawer slide outer member will move with respect to the drawer slide inner member.

4,696,583

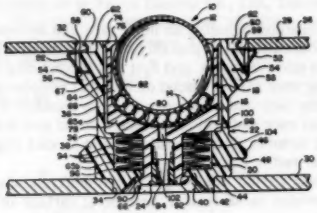
BALL SUPPORT ASSEMBLY

Frederick J. Gorges, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 829,404, Feb. 11, 1986, abandoned, which is a continuation of Ser. No. 614,277, May 25, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 922,703

Int. Cl.[4] F16C *29/04*; B60B *33/08*; B65G *13/00*

U.S. Cl. 384—49 **25 Claims**



1. A ball support assembly adapted for use as part of a cargo handling system, said assembly comprising:

a. a base member comprising:

1. an upper base portion having upper peripheral side wall means defining an upper chamber,
2. a lower base portion having a lower peripheral side wall means defining a lower chamber,
3. a bottom base portion,

b. a mounting member means mounted within said base member for limited up and down movement between an upper normal position and a lower depressed position, said mounting member means comprising:

1. an upper ball retaining portion positioned in said upper chamber and having side wall means and bottom wall means defining a ball receiving recess,
2. a lower connecting portion connected to and extending downwardly from the ball retaining portion,
3. said connecting portion having an operative connection with said bottom base portion to limit upward movement of said mounting member means beyond said upper normal position and yet to permit downward movement to said depressed position,

c. said mounting member means and said base member having cooperating stop means to limit any downward movement of the mounting member means beyond the depressed position,

d. a ball member rotatably mounted in said recess and positioned to provide a rotatable ball support surface,

e. compression spring means positioned in the lower chamber of the lower base portion of the base member in a manner to press downwardly against said bottom base portion and upwardly against said mounting member means in a manner to resiliently hold the mounting member means at the upper normal position and to yieldingly resist downward movement of the mounting member means due to loads imposed on the ball support surface,

f. said assembly being characterized in that an upward force exerted by said spring means against said mounting member means is, with said mounting member means in the normal position, and with no substantial downward load being exerted on the ball member, resisted at least primarily by said connecting portion reacting substantially in tension between said bottom base portion and said upper ball retaining portion of the mounting member means.

4,696,584

SELF-CLEANING AIR BEARING COMPRISING A FLOW EQUALIZING GROOVE AT THE BEARING PERIPHERY

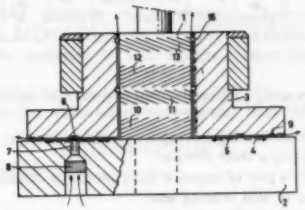
Leonardus P. M. Tielemans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 547,147, Oct. 31, 1983, abandoned. This application Dec. 11, 1985, Ser. No. 807,779

Claims priority, application Netherlands, Nov. 19, 1982, 8204481

Int. Cl.[4] F16C *32/06*

U.S. Cl. 384—107 **2 Claims**



2. A self-cleaning air bearing comprising a first part which rotates about an axis, and a second part, each of said parts having cooperating bearing surfaces dimensioned and configured to define at least one bearing gap, said gap having at least one circular periphery having an area at which the bearing gap opens into the atmosphere,

an air inlet communicating with said bearing gap at a location spaced from said periphery, and with the atmosphere,

at least one filter disposed in said air inlet,

at least one pattern of grooves formed on one of said surfaces for causing air to flow through said at least one filter into said gap, and

at least one continuous circular flow equalizing groove formed in one of said bearing surfaces, and disposed at least adjacent said area, arranged such that a flow of air is maintained outward to the atmosphere along all of said area;

said bearing comprising a thrust bearing and a cylindrical bearing;

said thrust bearing having an outer circumference and an inner circular periphery, said flow equalizing groove being an annular groove disposed adjacent said outer circumference of said bearing, said gap extending between said groove and said inner circular periphery, and said air inlet being spaced intermediately between said groove and said inner circular periphery;

said cylindrical bearing having a cylindrical bearing surface concentric about said axis, having a cylindrical gap arranged to communicate with said inner circular periphery and to extend axially to an outer cylindrical area communicating with the atmosphere; and a second continuous circular groove at least adjacent said outer cylindrical area,

said thrust bearing being arranged so as to pump air from said air inlet to said annular groove and to said inner periphery, and

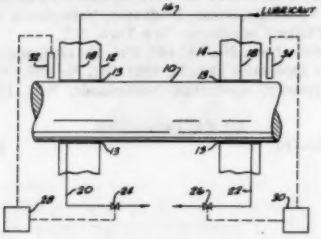
said cylindrical bearing being arranged such that air flows through said cylindrical gap from said inner periphery to said second groove,

whereby air outflow through the entire outer cylindrical area prevents dust from entering said bearing.

4,696,585
BEARING SUPPORT SYSTEM WITH CONTROLLABLE SPRING RATE

Judson S. Swearingen, 27403 Pacific Coast Hwy., Malibu, Calif. 90264

Filed Jan. 17, 1986, Ser. No. 820,534
Int. Cl.[4] F16C *17/02*
U.S. Cl. 384—399 5 Claims



1. A bearing support for a high speed rotating shaft, comprising

a journal bearing having a cylindrical bearing seat for supporting a shaft therein;

at least a pair of opposed fluid apertures defined in the inner face of said bearing seat;

fluid vent lines extending between each said pair of fluid apertures;

a vibration sensor positioned adjacent said bearing for generating a control signal responsive to shaft vibration;

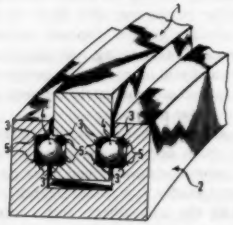
a valve disposed in each said fluid vent line to control fluid communication between said apertures; and

at least a valve controller responsive to said control signal for controlling at least one said valve in response to shaft vibration.

4,696,586
WIRE ROLL BEARING

Ulrich Krug, Hagen, Fed. Rep. of Germany, assignor to Hoesch Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 783,418, Oct. 3, 1985, abandoned. This application Oct. 27, 1986, Ser. No. 924,133
Claims priority, application Fed. Rep. of Germany, Oct. 4, 1984, 3436406
Int. Cl.[4] F16C *33/61*
U.S. Cl. 384—500 4 Claims

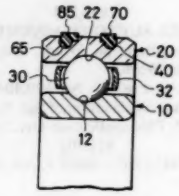


1. Wire roll bearing with slide and guideway and therebetween roll bodies arranged on running wires, with the running wires being movably positioned in the wire bed, characterized in that the running wires are tensioned at least at one end in compression or tension by the interposition of spring means, and further characterized by being structured as a circle segment bearing.

4,696,587
EXPANSION COMPENSATING BEARING

Soji Nishida, Fujisawa, and Nobuhiko Miyake, Yokohama, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1986, Ser. No. 881,896
Claims priority, application Japan, Jul. 16, 1985, 60-107630[U]
Int. Cl.[4] F16C *27/04, 43/04*
U.S. Cl. 384—536 13 Claims



1. A bearing including an inner race and an outer race disposed concentrically, a plurality of rolling members interposed between said two races, and first and second ring members of synthetic resin axially spaced on an outer peripheral surface of said outer race and wherein a rotating member is inserted in said inner race and said outer race is fitted and held in a non-rotating member through said first and second ring members, characterized in that:

first and second axially spaced circumferential grooves are provided in said outer peripheral surface of said outer race,

each of said circumferential grooves comprises a first portion situated toward a respective one axial end of said outer race and which has a bottom surface that includes an arcuate surface portion of a single radius, and a second portion located more toward the opposite axial end of said outer race than said first portion and being narrower and shallower than said first portion,

said first and second portions are formed continuously to each other,

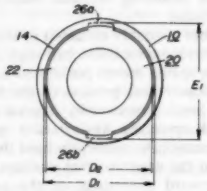
said first and second ring members are respectively closely held in said first and second circumferential grooves by injection-molding synthetic resin, and

an outer peripheral surface of each of said first and second ring members protrudes radially outward further than said outer peripheral surface of said outer race.

4,696,588
NON-SEPARABLE THRUST ROLLING BEARING

Yasuo Tanaka, and Akio Niikura, both of Fujisawa, Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1986, Ser. No. 846,268
Claims priority, application Japan, Mar. 29, 1985, 60-46167
Int. Cl.[4] F16C *19/10, 33/58*
U.S. Cl. 384—615 15 Claims



1. A non-separable thrust rolling bearing having a rotational axis comprising:

first and second annular bearing rings each having an inner and an outer dimetral end portion respectively;

a bent portion formed on an end of one of the inner and outer diametral portions of the second bearing ring and extending radially in a direction toward the other of the inner and outer diametral portions thereof, said bent portion being proximate one of the inner and outer diametral edge portions of the first bearing ring; and

a pair of opposed coupling members integrally formed on an end of one of the inner and outer diametral end portions of the one of the first and second bearing rings and having a radial width greater than the difference between the diameters of the bent portion as measured at the greatest radial extension thereof and of the one of the inner and outer diametral edge portions of the first bearing ring proximate the bent portion.

4,696,589

INK-DOT PRINTER

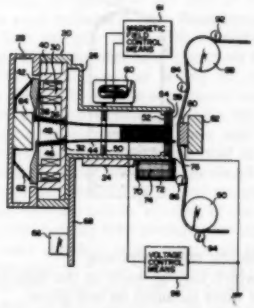
Shigeru Okuno; Yoshihiro Torisawa, both of Mishima; Mitsuharu Endo, Susono; Tetsuroh Nakayama, Mishima; Masashi Shimosato, Shizuoka, and Takafumi Fukushima, Fuji, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,618

Claims priority, application Japan, Oct. 26, 1984, 59-225531; Nov. 6, 1984, 59-233946

Int. Cl.⁴ B41J *3/12, 27/19*

U.S. Cl. 400—119 **3 Claims**



1. An ink-dot printer comprising:

a pair of slit forming members arranged so as to define a slit therebetween;

ink storage means for storing ink so that the slit between the two slit forming members is immersed in the ink;

a recording medium opposed to the slit;

a needle movable between a rest postition in which the distal end portion of the needle facing the recording medium is located in the slit and a projected position in which said distal end portion of the neele is projected from the slit so as to be located closer to the recording medium than when it is in the rest position;

driving means for moving the needle between the rest position and the projected position;

ink attracting means for generating a magnetic or electric field in the slit between the two slit forming ember for thereby attracting ink from the ink storage means into the slit to cause the attracted ink to attach to the distal end portion of the needle located in the rest position;

said ink attracting means including an electromagnet connected to the pair of slit forming members for generating a magnetic field in the slit; and

control means for electrically controlling said ink attracting means to cause it to generate a field to produce an ink attracting magnetic or electric force of sufficient intensity to attract ink from the ink storage means into the slit at the time of ink attraction, and for further electrically controlling said ink attracting means to cause it to generate a lower intensity field to produce an ink holding magnetic or electric force which is of lower intensity than said attracting magnetic or electric force, said ink holding magnetic or electric force being of a sufficient intensity to hold a predetermined amount of ink in the slit after the predetermined amount of ink is attracted into the slit;

said control means including a timer for setting the length of the ink attracting magnetic or electric force generating time;

wherein the ink attaching to the distal end portion of the needle at the rest position is moved to the recording medium to form an ink dot thereon as the needle moves to approach the recording medium in a projected position.

4,696,590

PRINTER HAVING A GUIDE FOR AN INSERTABLE CASSETTE WHICH CAN HOLD DATA AND TRANSFER STRIPS

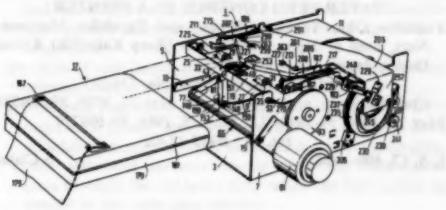
Waltherus C. J. Bierhoff; Pieter D. Schuitmaker; Cornelis Ouwerkerk, and Robertus J. M. Verhoeven, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 26, 1985, Ser. No. 780,733

Claims priority, application Netherlands, May 30, 1985, 8501541

Int. Cl.⁴ B41J *11/58*

U.S. Cl. 400—613 **11 Claims**



1. A printer having a guide for an insertable cassette, in which is provided a receipt strip displaceable with respect to a printing head, the cassette being provided with at least one entrance window for transport members of the said strip, characterized in that a lock releasable by an initial translation of the cassette in the printer releases a transport roller which is pivotable about a fixed shaft, is cylindrical and performs after a further translation of the cassette a pivotal movement into a cassette window on a first cassette side and consequently gets into pressure contact with the printing head on a second cassette side located opposite the first cassette side, the receipt strip being clamped during printing between the transport roller and the printing head.

4,696,591

FAN FOLDED PRINTER OUTPUT COLLECTOR

Robert W. Boyden, 6 Lakeview Ct., Novato, Calif. 94947

Filed Feb. 19, 1986, Ser. No. 831,224

Int. Cl.⁴ B41J *15/04*

U.S. Cl. 400—613.2 **6 Claims**

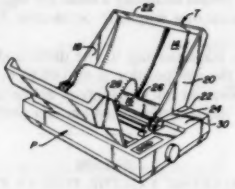
1. A paper collecting tray for attachment to a printer, said printer having fan folded printer output which is guided from the printer exit towards said tray in a substantially horizontal direction, said tray comprising:

a tray body;

a cam surface attached to said tray body, said cam surface adjacent said printer exit for receiving said printer output and guiding said printer output to and towards a paper receiving notch, said cam surface sloping from the point of printer output from said printer exit to an angle below

the horizontal and substantially normal to said tray body whereby fan folded printer output impinges upon said cam surface, climbs over the top of said cam surface, and passes to said paper receiving notch;

means for cantilevering said tray body from said printer adjacent said paper exit attached to said cam surface and tray surface; and



a tray surface on said tray body extending upwardly at an angle cantilevered from said printer exit in the range of 20° to 50°, said tray surface terminating at the lower end of said tray at said cam surface to define said paper receiving notch therebetween, whereby the major surface of said fan folded paper having a fold on said paper receiving notch stacks on said tray surface utilizing the columnar strength of said paper and the weight of said paper.

4,696,592

PAPER FEED CONTROL IN A PRINTER

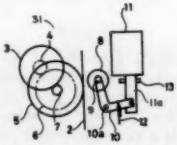
Yukihiko Oka, Yamatokoriyama, and Toyohiko Morimoto, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 22, 1985, Ser. No. 736,711

Claims priority, application Japan, May 22, 1984, 59-104205; May 23, 1984, 59-75996[U]; May 25, 1984, 59-106779

Int. Cl.⁴ B41J *13/02*

U.S. Cl. 400—636 **5 Claims**



1. A print control system in a printer which performs a printing operation onto a record-receiving medium, said print control system comprising:

input means for introducing a print instruction into said print control system;

printing means for performing said printing operation onto said record-receiving medium;

feed means for shifting said record-receiving medium through said printing means in a predetermined direction for a predetermined distance before and after said printing operation;

a print repetition control circuit which enables a predetermined number of successive printing operations by said printing means upon completion of each printing operation; and

control means, responsive to said input means, for controlling said printing means and said feed means in said printing operation;

said feed means including,

drive roller means for engaging and shifting said record-receiving medium through said printing means as said drive roller means rotates,

means for rotating said drive roller means only before and after each successive printing operation, said means for rotating holding said drive roller means stationary during each printing operation,

pinch roller means in opposing confrontation with said drive roller means for selectively securing said record-receiving medium against said drive roller means in each printing operation,

a shaft positioned through the axis of said pinch roller means so that said pinch roller means rotates freely therearound,

a solenoid having a reciprocally movable rod, and

a rotatable arm engaged with the shaft of said pinch roller means and with a portion of said reciprocally movable solenoid rod, wherein said solenoid is selectively activated by said control means to position said pinch roller means in contact with said record-receiving medium, thereby securing said record-receiving medium against said drive roller means during a printing operation.

4,696,593

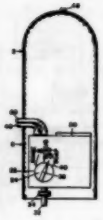
CAR WASHING MITT

James D. Bayless, 412 S. Bellaire, Kansas City, Mo. 64123

Filed Dec. 5, 1986, Ser. No. 938,455

Int. Cl.⁴ A46B *11/06;* **A47K** *7/03;* **B05C** *1/00*

U.S. Cl. 401—7 **3 Claims**



1. A car washing mitt comprising:

a. a glove which may be worn on the hand of a user,

b. a control valve mounted on said glove,

c. means whereby said control valve may be furnished with a constant supply of water under pressure,

d. a pad of sponge material mounted on the palm of said glove,

e. means for delivering water from said control valve to the interior of said pad,

f. a liquid soap reservoir also mounted on said glove and comprising an elongated hollow cylinder vented to the atmosphere at one end thereof,

g. soap-water mixing means mounted on said glove and operable by the flow of water therethrough comprising a passageway operable to receive water from said control valve and to deliver it to the interior of said pad and having a restricted portion whereby the flow of water therethrough creates a zone of sub-atmospheric pressure, said zone of sub-atmospheric pressure being interconnected to said hollow cylinder at the end thereof opposite from its atmospheric vent and

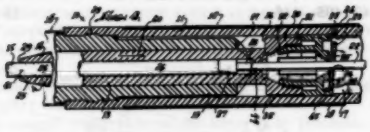
h. A piston mounted frictionally in said hollow cylinder for movement therealong, whereby when soap is withdrawn from said hollow cylinder said piston follows to render liquid soap continuously available at said zone of sub-atmospheric pressure, regardless of the physical position of said glove, said control valve being operable to deliver water selectively either through said mixing means to said pad, or directly to said pad in by-passing relation to said mixing means, or to stop the flow of water.

4,696,594

COSMETIC PENCIL HAVING ADVANCEABLE COSMETIC MASS

Ronald J. Powers, 109 S. Poinsettia Ave., Manhattan Beach, Calif. 90266

Filed Sep. 16, 1985, Ser. No. 776,390
Int. Cl.[4] A45D *40/02, 40/20*
U.S. Cl. 401—65 17 Claims



1. A cosmetic pencil containing a cosmetic mass in a thin pencil lead-like configuratio having means for advancing the cosmetic mass comprising:

an elongated lower cylindrical stop element assembly having a hollow opening which has a disk stop element adjacent said opening;

a forward barrel having a hollow opening affixed to said elongated lower cylindrical stop element assembly and axially aligned therewith, said stop element assembly and said forward barrel forming a holding tube assembly;

a sheath and push-rod member having an elongated hollow sheath having an applicator end and an inner end and having an axial cylindrical bore therethrough, said bore being at least partially filled with a cosmetic mass and having a push-rod member having its inner terminus positioned within said bore and having its outer terminus extending outwardly past the inner end of said sheath, said sheath and push-rod member having a shoulder on the outer surface thereof near the inner end thereof, said sheath and push-rod member being held in said forward barrel so that the applicator end of the sheath is extendable outwardly of said forward barrel and the push rod member extends into the hollow opening of the holding tube assembly, said holding tube assembly having a first holding tube inner shoulder which surrounds the sheath and push rod member and stops the forward movement of the shoulder of the sheath and push rod member;

a gripping disk having a sheath facing side and a stop element facing side and having a central opening which has an inside diameter which is slightly larger than the outside diameter of said push rod member and said disk being positioned about the push rod member and said disk fitting within said holding tube assembly and abutting the disk stop element of the lower cylindrical stop element assembly near its outer edge;

a gripping disk supporting member adjacent the sheath facing side of said gripping disk and closely surrounding the push rod member, said gripping disk supporting member having an inner gripping disk supporting ring including a gripping disk supporting face adjacent to the push rod member and normal to the axis of the push rod member and an annular recess around the exterior of said gripping disk supporting ring extending from within the area adjacent the sheath facing side of said gripping disk and outwardly apst the outer periphery of said gripping disk; and

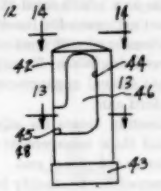
spring means between said gripping disk supporting member and said sheath which urges said sheath toward the shoulder of the holding tube assembly, whereby when said sheath is moved inwardly with respect to said disk stop element, the gripping disk abuts the disk stop element of the lower cylindrical stop element assembly and an edge thereof moves into the recess of the disk supporting member and causes it to grip the push rod member so that the cosmetic mass is moved outwardly of said sheath at its applicator end.

4,696,595

LOOSE LEAF BINDER LIFT LOCK

James Pinkney, Southgate, Mich., assignor to South Park Sales & Mfg., Inc., Lincoln Park, Mich.

Filed Dec. 4, 1986, Ser. No. 938,234
Int. Cl.[4] B42F *3/02*
U.S. Cl. 402—54 8 Claims



1. A loose leaf binder lift lock having a tubular body, a tubular locking ball carrier movably mounted in the body and carrying a plurality of locking balls in one end for locking engagement with a locking rod attached to the rear cover of a loose leaf binder, a pull ring stud mounted in the other end of the ball carrier, a retainer spring for retaining the ball carrier, and a pull ring attached to the pull ring stud for moving the ball carrier to a ball unlocking position, characterized in that:

(a) the pull ring stud has a longitudinal slot, having an outer end and an inner end, formed on each of a pair of diametrical opposite sides and spaced transversely apart by a central rib;

(b) each of said longitudinal slots having a communicating entrance slot at the inner end thereof; and,

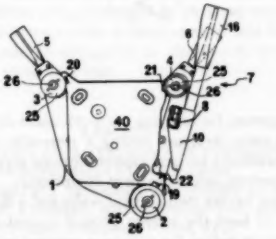
(c) the pull ring has a pair of attachment arms, with their inner ends spaced apart from each other, and with each attachment arm detachably mounted in one of the longitudinal slots, and movable into or out of the longitudinal slots through the entrance slots when the ball carrier is moved to the unlocking position.

4,696,596

EQUIPMENT MOUNTING MECHANISM

Lionel V. F. Russell, Suffolk, United Kingdom, assignor to W. Vinten Limited, England

Filed Jun. 17, 1985, Ser. No. 744,972
Claims priority, application United Kingdom, Jun. 16, 1984, 8415417
Int. Cl.[4] F41G *1/38;* F16M *11/04;* F16B *21/00*
U.S. Cl. 403—321 10 Claims



1. An equipment mounting mechanism for removably mounting a component to an object comprising:

a female section attached to one of the component and object;

a male section attached to the other of the component and object;

a holding means on said female section for adjustably hold-

ing said male section to said female section, said holding means including;

(a) first, second, and third engagement means which form a plane and between which said male section is located for immovably engaging said male section in two of three mutually perpendicular axes and for allowing free movement of said male section along the third mutually perpendicular axis which third axis is in the plane,

(b) a first mounting means for fixedly mounting said first engagement means to said female section,

(c) a second mounting means for adjustably and lockably mounting said second engagement means in the direction of the third axis,

(d) a third mounting means for adjustably and lockably mounting said third engagement means is a direction perpendicular to the plane, and

(e) a locking means for releasably locking said male section against movement along the third axis after a desired alignment with said second and third mounting means whereby said male section is removable from said female section along the third axis by release from said locking means and returnable to the desired alignment by reinsertion along the third axis and locking in place with said locking means.

4,696,597

EQUIPMENT FOR CARRYING OUT WORK, UNDER DRY CONDITIONS, ON AN UNDERWATER STRUCTURE

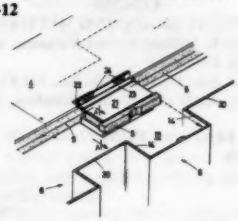
Willy Sonck, Denderleeuw, Belgium, assignor to General Coatings, Denderleeuw, Belgium

Filed May 22, 1986, Ser. No. 866,120

Claims priority, application Belgium, May 29, 1985, 215094; Sep. 11, 1985, 215568

Int. Cl.[4] B63C *11/00, 11/40*

U.S. Cl. 405—12 **5 Claims**



1. Equipment for carrying out work under dry conditions on an underwater structure having a generally vertical surface with substantially vertical grooves formed therein at predetermined intervals, said equipment comprising:

a caisson having two vertical walls and a floor,

means to keep the caisson pressed against the underwater structure before the caisson is emptied by pumping, and

a plurality of horizontally adjustable sealing sheets supported by said floor, said horizontally adjustable sealing sheets being extendable into said substantially vertical grooves,

said vertical walls and floor having exposed edges lined with strips made of an elastic sealing material,

said sealing sheets also having exposed edges lined with strips made of an elastic sealing material.

4,696,598

ERECTING/LYING-DOWN DAM OR SLUICE GATE MADE OF FLEXIBLE SHEET

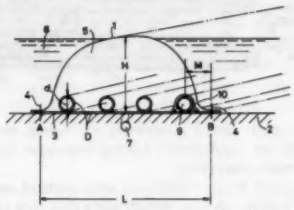
Yoshiomi Tsuji; Ichiro Maruyama, and Hiroshi Takuma, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 30, 1986, Ser. No. 880,663

Claims priority, application Japan, Aug. 21, 1985, 60-184875; Aug. 21, 1985, 60-184876

Int. Cl.[4] E02B *7/20*

U.S. Cl. 405—115 **13 Claims**



1. A collapsible dam or sluice gate which is expandable upon fluid supply therein and deflatable upon fluid discharge therefrom comprising:

a cover made of a flexible sheet which can expand and deflate;

an attaching means including at least two rows of fittings extending in a transverse direction to the direction of the flow of a river or the like, for attaching said cover to the bottom of said river or the like; and

a lower interior surface means having

a base sheet situated between said two rows of fittings, being attached to said cover and able to be supported along a bottom of a river or the like by a concrete formation or the like,

a plurality of corrugations forming members, located between said fittings for forming a non-planar lower interior surface means, so that the area of an upper surface of said lower interior surface is increased relative to a planar surface, and upon deflation, when said cover lies along said non-planar lower interior surface means, the length of a floating portion of said deflated cover is minimized.

4,696,599

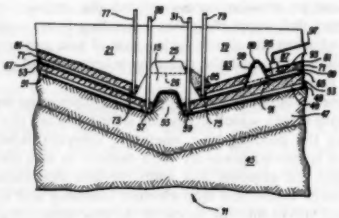
SECURE LANDFILL AND METHOD OF OPERATING A LANDFILL FOR HAZARDOUS WASTE

Randolph W. Rakoczynski, Niagara Falls; Stephen S. Odojewski, N. Tonawanda, and John I. Rolfe, Youngstown, all of N.Y., assignors to Waste Resource Associates, Inc., Niagara Falls, N.Y.

Filed Jul. 14, 1986, Ser. No. 885,428

Int. Cl.[4] C02F *1/00*

U.S. Cl. 405—129 **8 Claims**



1. A hazardous waste landfill comprising:

(a) a foundation having generally concave contour having side portions and a bottom portion, said foundation having a common low area or point to which liquids within the landfill can be centrally collected,
(b) a sub-base comprised of a substantially water impermeable material, said material lining said side and bottom portions of said foundation,
(c) a first continuous, water impervious synthetic liner overlaying said sub-base,
(d) a secondary leachate collection system positioned atop said liner, said collection system comprised of a plurality of permeable pipes imbedded in a layer of aggregate material, said system draining toward said common low area or point,
(e) means for collecting and removing liquid from said secondary leachate collection system,
(f) a second continuous water impervious synthetic liner overlaying said secondary leachate leak collection system,
(g) a plurality of berms fabricated of substantially water impermeable material positioned atop said second liner dividing the landfill area into a plurality of separate water tight zones,
(h) a primary leachate collection system positioned atop said second liner overlaying said secondary leachate collection system, comprised of a plurality of permeable pipes embedded in a layer of aggregate material, said system draining toward said common low area or point, and
(i) means for collecting and recovering liquids from said primary leachate system.

4,696,600

METHOD AND APPARATUS FOR MODIFYING THE CROSS-SECTIONAL PROFILE OF AN ADIT, TUNNEL OR THE LIKE

Georg Hurtz, Erkelenz-Holzweiler; Willi Steufmehl, Erkelenz, and Wolfgang Krappen, Wassenberg, all of Fed. Rep. of Germany, assignors to Wirth Maschinen- und Bohrgerate-Fabrik GmbH, Erkelenz, Fed. Rep. of Germany

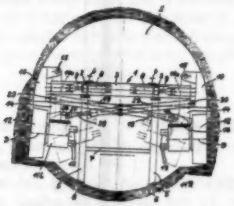
PCT No. PCT/DE85/00199, § 371 Date Feb. 12, 1986, § 102(e) Date Feb. 12, 1986, PCT Pub. No. WO86/00113, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 10, 1985, Ser. No. 848,047

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1984, 3421704

Int. Cl.[4] E01G *3/04*

U.S. Cl. 405—138 **23 Claims**



1. A method of modifying a cross-sectional profile of an adit, tunnel gallery or like elongate aperture comprising widening the profile in selected areas thereof with a rotary boring head having an axis of rotation oriented transversely to a longitudinal axis of the aperture and to which a feed movement can be imparted in the direction of said axis of rotation, the method including the steps of using the boring head to bore a first recess in a wall of the aperture by imparting the feed movement to the boring head, retracting the boring head, moving the boring head forward in the lengthwise direction of the aperture, then using the boring head to form another recess in the wall of the aperture overlapping the first recess, the boring, retracting, and forward moving steps of the boring head being repeated in such a manner that a plurality of individual recesses overlapping one another is produced in the wall of the aperture as a sequence extending in the lengthwise direction of the aperture.

4,696,601

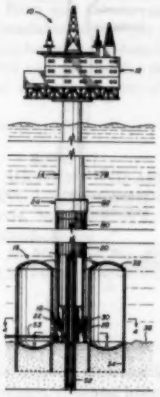
ARTICULATED COMPLIANT OFFSHORE STRUCTURE

George F. Davenport, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Jul. 14, 1986, Ser. No. 885,358

Int. Cl.[4] E02B *17/00*

U.S. Cl. 405—202 **30 Claims**



1. A compliant offshore structure, comprising:
a base adapted to be supported on the ocean floor;
a substantially vertical tower extending upward from said base to a position proximate the ocean surface, the longitudinal axis of said tower defining the central axis of said structure;
a joint establishing the interface between said tower and said base, said joint being articulated to permit said tower to pivot about said base; and
a plurality of elongate stabilizing members each having a first end secured to said base at a spaced lateral distance from said central axis and a second end secured to said tower at a stabilizing member anchorage located a spaced distance above said articulated joint, said stabilizing members being installed in a pretensioned condition, said stabilizing members being arranged in an array surrounding said central axis whereby at least some of said stabilizing members undergo elongation in response to pivoting of said tower about said base.

4,696,602

APPARATUS AND SYSTEM FOR FLOODING SUBMERGED STRUCTURES

Richard A. Daigle, Sr., Thibodaux, La.; William G. Stanfield, and Michael E. Crenshaw, both of Dallas, Tex., assignors to LTV Energy Products Company, Dallas, Tex.

Filed Mar. 27, 1986, Ser. No. 844,711

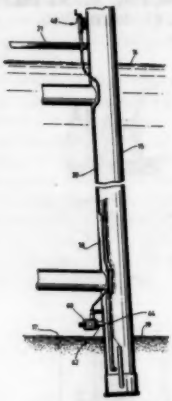
Int. Cl.[4] E02B *17/02;* **E02D** *21/00, 23/02*

U.S. Cl. 405—205 **6 Claims**

1. A flooding system to set a marine platform in a body of water where the platform includes a surface structure disposed above the body of water, at least one support structure attached to and extending below the surface structure to penetrate the bottom of the body of water, each support structure defining a hollow member having at least one port below the

waterline whereby closure of the port renders the hollow member sealed, the system comprising:

a valve assembly coupled to the support structure at the port operable to open and close the port, the valve assembly defining a water flow path between a valve inlet and a valve outlet coupled to the port when the valve assembly is in the open position and sealing the hollow member when in the closed position;



a remote control assembly coupled to the valve assembly, the remote control assembly comprising an outer flexible casing, a flexible member disposed for axial movement within the flexible casing, and means disposed between the flexible casing and the flexible member for reducing friction between the flexible casing and flexible member; and

means for imparting axial movement to the flexible member, thereby to operate the valve assembly into the open and closed positions.

4,696,603

COMPLIANT OFFSHORE PLATFORM

Mark A. Danaczko; Lyle D. Finn; M. Sidney Glasscock; Michael P. Piazza; Kenneth M. Steele, and Timothy O. Weaver, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Dec. 5, 1985, Ser. No. 806,055

Int. Cl.[4] E02B *17/02*

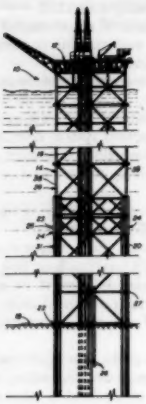
U.S. Cl. 405—227 **42 Claims**

1. A compliant offshore platform for use in hydrocarbon drilling and producing operations, comprising:

a deck;

a substantially rigid vertical tower adapted to support said deck above the ocean surface, said tower having a base and being adapted to pivot relative to the ocean floor about its base in response to the action of waves, the combination of said deck and tower having a net negative buoyancy and being free from guyline support; and

means for applying a vertical couple to said tower in response to pivoting of said tower, said couple being applied at a position on said tower intermediate said tower base and the bottom of the wave zone of the ocean environ-



ment in which said tower is situated, said vertical couple tending to resist sway of the tower away from the vertical.

4,696,604

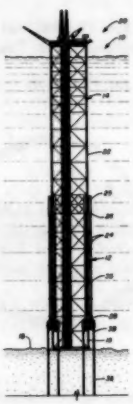
PILE ASSEMBLY FOR AN OFFSHORE STRUCTURE

Lyle D. Finn, and Kenneth M. Steele, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Aug. 8, 1986, Ser. No. 894,547

Int. Cl.[4] E02B *17/02*

U.S. Cl. 405—227 **22 Claims**



1. A pile assembly adapted for use in supporting a compliant offshore structure having a plurality of vertical support legs extending from the ocean floor to a work deck proximate the ocean surface, said pile assembly comprising:

a plurality of elongate, substantially vertical lower piles set into the ocean floor;

a plurality of elongate, substantially vertical upper piles having opposed upper and lower end portions, the lower end portion of each of said upper piles being laterally adjacent and fixedly secured to the upper end of at least one of said lower piles;

means for securing the upper end portion of each of said upper piles to a corresponding one of said vertical support legs; and

means for maintaining a fixed spacing between the lower ends of said upper piles.

4,696,605

COMPOSITE REINFORCED CONCRETE AND TIMBER PILE SECTION AND METHOD OF INSTALLATION

Gerard J. Gillen, Jr., 4512 Ithaca St., Metairie, La. 70006

Filed Mar. 7, 1986, Ser. No. 837,707

Int. Cl.[4] E02D 5/22, 5/52

U.S. Cl. 405—251 8 Claims

1. A method for installing a composite pile of a timber pile section and a precast, reinforced concrete pile section comprising the steps of:

a. simultaneously driving a timber pile section and a tubular sleeve positioned vertically above the sleeve and connected thereto into the earth so that the timber pile section is a distance well below the earth's surface, a distance substantially equal to the length of the reinforced concrete pile section;

b. using a tubular sleeve with a hollow bore during the simultaneous driving of the timber pile section and the tubular sleeve to prevent soil from entering the area vertically above the timber pile;

c. placing a precast, reinforced concrete pile in the bore of the sleeve;

d. joining the bottom of the concrete pile and the top of the timber pile with a connector that is embedded partially in the lower end of the concrete pile prior to joining;

e. removing the tubular sleeve so that soil encroachment can laterally support the reinforced concrete pile section.

4,696,606

METHOD OF STABILIZING A ROCK STRUCTURE

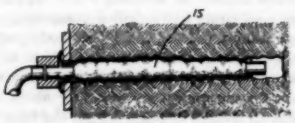
Lorne R. Herron, Beaconsfield, Canada, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Jun. 16, 1986, Ser. No. 874,627

Claims priority, application Sweden, Jun. 17, 1985, 8502981

Int. Cl.[4] E21D 20/00

U.S. Cl. 405—259 18 Claims



1. A method of stabilizing a rock structure, comprising:

boring a borehole in said rock structure;

inserting a tubular stabilizer into said borehole such that at least a portion of said tubular stabilizer protrudes from said borehole, said tubular stabilizer being made of mild steel and having a substantially circular cross-section which is slimmer than the cross-section of said borehole;

pressurizing an expandable body inside said tubular stabilizer while said tubular stabilizer is in said borehole, by applying a pressure fluid to the interior of said expandable body, to thereby expand said expandable body within said tubular stabilizer past the inner original perimeter limits of said tubular stabilizer over a substantial portion of the length of said tubular stabilizer so that said tubular stabilizer is widened radially over a substantial portion of its length to fill irregularities of said borehole and is caused to elastically widen the rock around said tubular stabilizer; and

then depressurizing said expandable body to reduce the diameter of said expandable body so as to release said expandable body from said tubular stabilizer, and then removing said expandable body from said tubular stabilizer which is left anchored in said borehole by a shrinkage fit between the rock and said tubular stabilizer when said rock shrinks after depressurization of said expandable body.

4,696,607

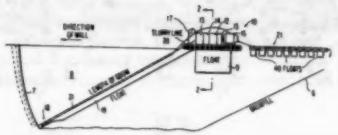
SLURRY TRENCH METHOD AND APPARATUS FOR CONSTRUCTING UNDERGROUND WALLS

Arturo L. Ressi di Cervia, New York, N.Y., assignor to Finic, B.V., Rotterdam, Netherlands

Filed Jul. 30, 1980, Ser. No. 173,538

Int. Cl.[4] E02D 5/00, 29/00

U.S. Cl. 405—267 14 Claims



1. In a system for constructing a narrow underground wall, said system including a first apparatus for excavating from one end of a slurry filled trench and a second apparatus for filling the trench with a wall forming material, the improvement comprising floatation means and wherein at least a part of said first apparatus is floated at the surface of the slurry in said trench on said floatation means.

4,696,608

TRANSPORT DUCT FOR FIBER FLOCKS

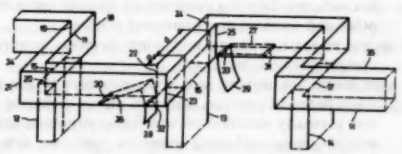
Paul Stäheli, Wilen bei Wil, Switzerland, assignor to Maschinenfabrik Rieter A.G., Winterthur, Switzerland

Filed Oct. 28, 1985, Ser. No. 792,829

Claims priority, application Switzerland, Oct. 30, 1984, 5176/84

Int. Cl.[4] B65G 53/36, 53/40

U.S. Cl. 406—155 12 Claims



10. A transport duct of substantially constant rectangular cross section for feeding a fibrous material carried by a transport medium flowing through the interior of the duct via respective openings into a plurality of chutes which are spaced from one another longitudinally of the duct and lead to pro-

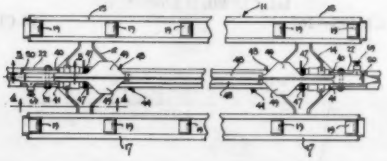
cessing equipment for the fibrous material, comprising at least one duct section situated immediately upstream of one of said chutes as considered in the direction of flow of the transport medium, at which the duct undergoes an abrupt change of direction of between 70° and 110° for the fibrous material to be decelerated by contact with the duct and descend more abundantly than otherwise onto said one chute, said duct including a top wall, a bottom wall, and two lateral walls together bounding the interior of the duct; and a control plate mounted in said interior for pivoting about an axis located at said bottom wall and extending transversely of the direction of flow between an open position in which said control plate rests on said bottom wall and a plurality of closing positions in which it partially obstructs the flow of said transport medium, said control plate being situated immediately upstream of said section and extending in the downstream direction from said axis, and being arrestable in said positions thereof.

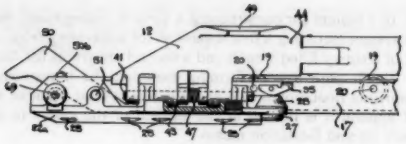
4,696,609

PALLET RESTRAINT MECHANISM FOR CARGO LOADING SYSTEM

Stephen C. Cole, Hermosa Beach, Calif., assignor to Ancra Corporation, Hawthorne, Calif.

Filed Apr. 21, 1986, Ser. No. 854,110
Int. Cl.[4] B60P *1/64, 7/13;* B64C *1/22*
U.S. Cl. 410—69 **8 Claims**





1. A device for use in alternatively loading either predetermined wider or narrower cargo onto the floor of a vehicle and restraining such loaded cargo comprising:

a frame structure including roller means for supporting said cargo,

means for mounting said frame structure on the vehicle floor,

a pair of similar wing members,

means for pivotally mounting said wing members on said frame structure for movement between an upright position whereat the wing members are directly opposite each other and a spread apart flattened position,

spring means for urging said wing members towards the upright position, and

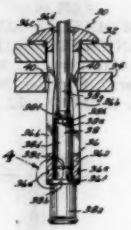
cam means for driving said wing members to the spread apart flattened position, said cam means including a cam arm pivotally mounted on said frame structure, said cam arm engaging said wing members, said cam arm being driven by said wider cargo to drive said wing members to the flattened position to permit the cargo to ride thereon, said wing members having clamping means formed thereon for retaining said narrower cargo in position on said frame structure when the wing members are in the upright position.

4,696,610

BLIND FASTENER

Jewel L. Wright, 1506 W. Flora Ave., Santa Ana, Calif. 92704

Filed Sep. 18, 1985, Ser. No. 777,464
Int. Cl.[4] F16B *13/06*
U.S. Cl. 411—38 **6 Claims**



1. A blind fastener having a stem movably positioned within a sleeve and attached thereto for pulling a solid annular blind end of said sleeve and urging legs of said sleeve into engagement with a work piece, the combination therewith of,

legs formed in said sleeve extending longitudinally thereof and separated by slots, said legs terminating at a location axially spaced from said blind end; and

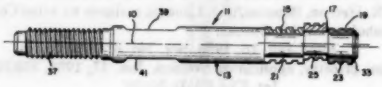
at least one crimped portion formed in each of said legs to control the collapse of said legs as said stem pulls said legs into engagement with said work piece, said crimped portions being closer to the stem than the remainder of the respective leg, and said crimped portions being at substantially the same axial location in each leg so that the legs collapse uniformly, said crimped portions being axially located within the grip range of the particular blind fastener.

4,696,611

REUSABLE ANCHOR

Albert Guay, 5060 Henderson St., Los Angeles, Calif. 90032, assignor to Albert Guay, Los Angeles, Calif.

Filed Apr. 15, 1986, Ser. No. 852,145
Int. Cl.[4] F16B *37/04, 39/00*
U.S. Cl. 411—103 **10 Claims**



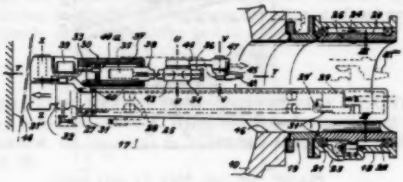
1. A reusable anchor for securing a drill supporting base in place along a substrate to be drilled comprising a first body portion engageable to the base, a second body portion extendable into a bore formed within the substrate to be drilled, and first and second sleeves, said first sleeve having a concentric bore formed therethrough and rotatable about said second body portion to remain in place within the bore as said first body portion is rotated, said second sleeve having an eccentric bore formed therethrough and rotatable about said second body portion such that upon rotation of said first body portion said second sleeve is urged to an eccentric position with respect to said first sleeve to wedge the anchor in place with minimal rotational friction within the bore.

4,696,612

TOOL HOLDER ROBOT FOR INTERVENING IN AN ENCLOSURE HAVING AN ACCESS OPENING

Jean-Claude Germond, and Gilles Clement, both of Paris, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 19, 1985, Ser. No. 777,714
Claims priority, application France, Sep. 20, 1984, 84 14433
Int. Cl.[4] B25J *19/00*
U.S. Cl. 414—8 12 Claims



1. A tool holder robot for carrying out interventions within an enclosure having a cylindrical access opening, comprising a cylindrical ferrule fixed to said opening, said ferrule having two open ends, a cylindrical shaft mounted in rotary manner in the ferrule, an axial guide rail having an opened U-shaped cross-section parallel to central axis Y—Y of the shaft, fixed to the inner wall of the shaft but offset with respect to said central axis Y—Y of said shaft so that said guide rail only occupies part of the cross-section of the cylindrical shaft and leaves free a passage space, a first arm slidingly mounted in said guide rail, said first arm having a first end guided in said guide rail and a free second end which remains outside the guide rail when said first arm is sliding within said guide rail, a second arm mounted in a pivotable manner on said second end of the first arm about an axis Z—Z perpendicular to axis Y—Y of the shaft, and a tool holder carriage slidingly mounted on the second arm, said second arm being able to pivot 360° about axis Z—Z and to be positioned so that its longitudinal axis T—T is parallel to axis Y—Y of the shaft, said first arm being capable of sliding along said guide rail when said longitudinal axis T—T of said second arm is parallel to said axis Y—Y of said cylindrical shaft so that said tool holder carriage carrying a tool is able to go through said free passage space left free by the offsetting of said guide rail with respect to said longitudinal axis Y—Y of said cylindrical shaft, so as to permit a change in the tool carried by said tool holder carriage from the outside of the enclosure without removing the tool holder robot.

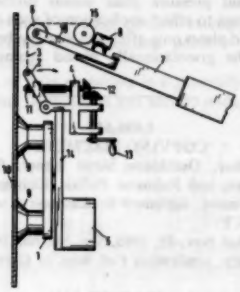
4,696,613

ARRANGEMENT FOR VERTICALLY POSITIONING PLATE-SHAPED BODIES

Thomas O. Hahn, Frankfurt am Main, Fed. Rep. of Germany, assignor to Glasbau Hahn GmbH & Co.Kg., Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 16, 1985, Ser. No. 776,572
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435144
Int. Cl.[4] E04G *21/14;* B66C *1/02*
U.S. Cl. 414—11 5 Claims

1. An arrangement for use with a crane arm for vertically positioning a plate-shaped body, comprising a suction device operative for holding the plate-shaped body by suction at a suction plane and a traverse for supporting said suction device, means for hoisting and lowering said suction device, comprising an elongated flexible element, a support for said flexible element, said flexible element having a free end portion; a cable pulley and a cable rope, and means for raising and lowering said cable rope; means for mounting said suction device on said end portion of said flexible element at a variable point of attachment, comprising a tilting device connected to said suction device and to said rope, means for driving said tilting device, said means for mounting the suction device being operative to displace said point of attachment toward and away from said suction plane, whereby the position of the center of gravity of the combination of said arrangement with said plate-shaped body varies until the point of attachment is above said center of



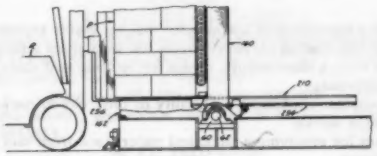
gravity and said plate-shaped body extends vertically; and wherein said suction device has a side which faces away from said suction plane and comprising a counterweight attached to said side of said suction device.

4,696,614

APPARATUS FOR RECUBING BOXES

Lenard E. Moen, 7914 Michigan, Whittier, Calif. 90602

Division of Ser. No. 479,800, Mar. 23, 1983, abandoned. This application Dec. 18, 1985, Ser. No. 810,209
Int. Cl.[4] B65G *57/28*
U.S. Cl. 414—28 11 Claims



1. Apparatus for recubing palletized containers arranged in a cubed plurality of adjacent rows each having a plurality of tiers, comprising:

a conveyor of sufficient width, transversely to its conveying direction, to receive the long axis of a pallet thereon for sidewise translation of the pallet and its contents towards a discharge end of said conveyor;

a first tilt station positioned adjacent said discharge end of said conveyor, said tilt station having a horizontally disposed tilt axis that is substantially parallel to the long axis of a pallet on said conveyor;

said first tilt station having a right angularly related pair of first and second frames that are copivotable between two positions about said tilt axis within an arcuate range;

said range being sufficiently large that the weight of a palletized load of containers disposed between said frames can be shifted sufficiently to opposite sides of said tilt axis to effect free gravitational biasing of the containers against both of said frames;

a first one of said frames in a first position of said first tilt station being essentially horizontally disposed to receive a palletized load of cubed containers thereon from said conveyor;

powered means to effect tilting of said first tilt station through said range to effect free shifting of the gravitational bias of a palletized load of cubed containers onto

said second frame when said first tilt station is tilted away from said first position of said first frame; and

pressure plate means on said first tilt station comprising a pair of plates positioned to apply opposing pressures to opposite ends of a palletized load of containers in said tilt station, said pressure plate means further comprising power means to effect application of such opposing pressure by said plates only after said load has been sufficiently tilted to be gravitationally biased against said second frame.

4,696,615

COPYING MACHINE

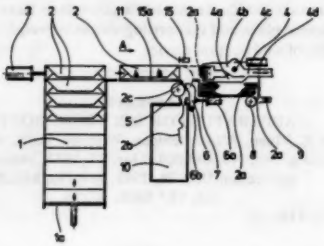
Helmut Ettischer, Ostfildern; Arno Ebner, Stuttgart; Rolf Munz, Kernen, and Raimund Pollak, Eislingen, all of Fed. Rep. of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 25, 1985, Ser. No. 802,109

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443362

Int. Cl.[4] B65H *1/30*

U.S. Cl. 414—114 **7 Claims**



1. In a reproduction machine for making visible representation of information on paper sheets fed by a sheet separating device from a sheet supply, means for refilling said sheet supply comprising:

a container containing a plurality of fully closed packaged paper stacks;

means for removing a packaged paper stack from said container;

means for receiving a packaged paper stack and opening the packaging thereof;

means for gripping the paper stack within an opened package, said gripping means being movable to a position associated with said sheet supply to remove the stack from its opened package and transport the stack into operative association with the sheet separating device for feeding such sheets seriatem to have information reproduced thereon.

4,696,616

APPARATUS FOR UNLOADING CYLINDRICAL ARTICLES FROM PALLETS

Kenneth F. C. Avey, Epping, England, assignor to W & C Pantin Ltd., Epping, England

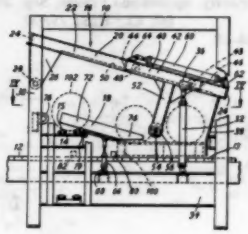
Division of Ser. No. 675,935, Nov. 28, 1984, Pat. No. 4,632,633. This application Nov. 17, 1986, Ser. No. 931,182

Claims priority, application United Kingdom, Oct. 25, 1984, 8427037

Int. Cl.[4] B65G *65/00*

U.S. Cl. 414—417 **6 Claims**

1. Apparatus for removing cylindrical articles such as kegs from a pallet on which the articles are arranged in a plurality of rows, resting on their sides, the apparatus comprising means for moving a loaded pallet to an unloading station adjacent a discharge conveyor, and a transfer mechanism for moving the articles row by row from a pallet at the unloading station to the discharge conveyor, the transfer mechanism comprising a sub-frame, a carriage mounted in the sub-frame so as to be movable relative to the sub-frame in a direction towards and away from the discharge conveyor, the sub-frame being pivotable about a horizontal axis at right angles to such movement of the carriage so as to effect movement of the carriage between a raised position and a lowered position, a pusher member suspended from the carriage being arranged when the carriage is in the lowered position to engage a row of articles on the pallet and when in the raised position to clear the articles on the pallet, and means for moving the carriage so that the pusher member is moved behind each row of articles in turn to push the row of articles from the pallet onto the discharge conveyor.



4,696,617

APPARATUS FOR FEEDING BAR-LIKE MATERIALS

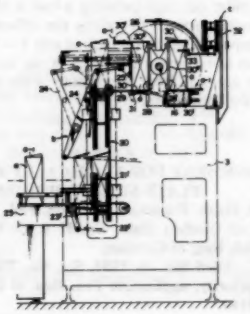
Katsuhiko Kumata; Isao Endo, both of Nagareyama; Syozi Numa, Tokyo; Ichiro Hirose; Takayoshi Sagawa, both of Hiratsuka, and Katsuyoshi Matono, Fukuoka, all of Japan, assignors to Tokyo Automatic Machinery Works, Ltd. and Japan Tobacco, Inc., both of Tokyo, Japan

Filed Oct. 10, 1984, Ser. No. 659,217

Claims priority, application Japan, Oct. 18, 1983, 58-195749

Int. Cl.[4] B65G *65/23*

U.S. Cl. 414—422 **9 Claims**



1. An apparatus for feeding bar-like materials, comprising:

a feeding frame which forms a flat bottomed feeding passage,

means located at an inlet end of the feeding passage for containing the bar-like materials in layered form across the feeding passage,

means for inverting receiving boxes which contain the bar-like materials therein and which have open upper faces,

means on the feeding frame for collectively feeding the bar-like materials in each receiving box to the feeding passage by lifting each receiving box which comes to a predetermined position in the feeding passage,

means on the feeding frame for discharging each lifted re-

ceiving box which is now blank, from the feeding frame, and

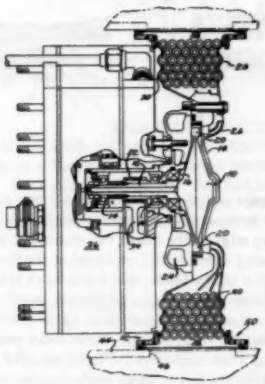
means located at the inlet end of the feeding passage for successively conveying the inverted receiving boxes, one by one, to the feeding passage, in at least a closely adjacent relation to each other such that the discharged bar-like materials in layered form across the feeding passage are further contained by the next closely adjacent receiving box which forms a back wall for said discharged bar-like materials and such that said next closely adjacent receiving box transfers said discharged bar-like materials to a storing device during subsequent conveyance of said next closely adjacent receiving box to said feeding passage.

4,696,618

HIGH TEMPERATURE SEAL AND TURBINE MOUNT

Jeffery Fairchild; Steven A. Heitz, and John Symington, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 17, 1985, Ser. No. 788,625
Int. Cl.[4] F01K *1/06*
U.S. Cl. 415—119 **8 Claims**



5. A power plant comprising

a turbine wheel rotatable about an axis;

a turbine housing surrounding said turbine wheel and having a radially directed, peripheral outlet including two axially spaced side walls;

a tubular housing containing said turbine wheel and said turbine housing and including a radially inwardly opening port aligned with said outlet;

rings of elastomeric material secured to respective ones of said walls near the radially outer peripheries thereof and about said axis; and

O-ring seals sealingly engaging said tubular housing about said port and sealed to said elastomeric rings.

4,696,619

HOUSING FOR A TURBOJET ENGINE COMPRESSOR

Alain M. J. Lardellier, Melun, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France

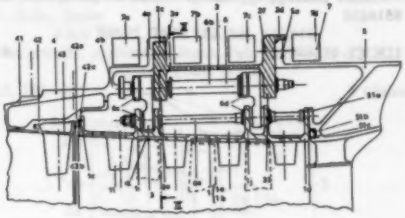
Filed Feb. 13, 1986, Ser. No. 829,019
Claims priority, application France, Feb. 23, 1985, 85 02023
Int. Cl.[4] F01D *25/26*
U.S. Cl. 415—138 **10 Claims**

1. A housing for a turbojet engine compressor having at least one annular array of stator vanes and at least one rotor blade wheel rotating about a longitudinal axis of the engine, comprising:

(a) first and second semi-cylindrical inner housing portions joined together along a common plane containing the longitudinal axis of the engine, the inner portions having the stator vanes attached thereto and extending about the rotor blade wheel such that a clearance is defined between the inner portions and tips of the blades on the rotor blade wheel;

(b) an annular outer housing portion extending about the first and second inner housing portions and radially spaced therefrom;

(c) a plurality of links extending in a generally radial direction, each link having first and second ends;



(d) first attaching means to pivotally attach the first ends of the links to the inner housing portions; and,

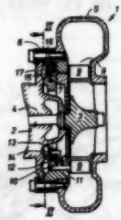
(e) second attaching means to pivotally attach the second ends of the links to the annular outer housing, such that thermal expansion or contraction of the inner and outer housing portions serves to maintain the clearance between the inner housing portions and the rotor blade tips throughout variations in operating parameters of the turbojet engine.

4,696,620

FLUID FLOW MACHINE

Georg Ruetz, Immenstaad, and Jürgen Giesselmann, Markdorf, both of Fed. Rep. of Germany, assignors to MTU Friedrichshafen GmbH, Fed. Rep. of Germany

Filed Feb. 13, 1986, Ser. No. 828,878
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513823
Int. Cl.[4] F01D *17/14*
U.S. Cl. 415—164 **5 Claims**



1. A fluid flow machine, comprising fluid flow housing means, a radial rotor arranged in said housing means, said housing means including an annular space which is radially traversed by the fluid medium, a guide wheel arranged in said annular space whose adjustable guide blades are operatively connected with bearing pins aligned substantially parallel to the rotor axis, bearing housing means for a rotor shaft, said bearing pins being rotatably supported in bearing bores of a housing wall ring means attached at the bearing housing means and forming a housing part of the fluid flow housing means, said bearing pins being operatively connected with actuating lever means which cooperate with an adjusting ring means for the guide blade adjustment, the housing wall ring means being

divided along the center of the bearing bores, and the guide blades being constructed in one piece with the bearing pins and the actuating lever means.

4,696,621

AEROFOIL SECTION MEMBERS FOR GAS TURBINE ENGINES

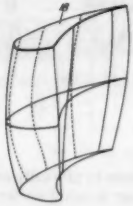
Martin Hamblett, Derby, and Duncan J. Livsey, Burton-on-Trent, both of England, assignors to Rolls-Royce, London, England

Filed Apr. 29, 1986, Ser. No. 856,986

Claims priority, application United Kingdom, Jun. 28, 1985, 8516436

Int. Cl.[4] F04D *29/68*

U.S. Cl. 415—191 **4 Claims**



1. An aerofoil section member for a gas turbine engine the member having a pressure surface comprising a concave flank and a suction surface comprising a convex flank, both said flanks extending radially between the ends of the member, the member being defined by a stack of elemental aerofoil shaped sections, the thickness of each elemental aerofoil section at locations between the ends of the member varying so that both the convex and concave flanks are convex in the spanwise direction along the member.

4,696,622

ULTRASONIC CHANNEL DIFFUSER

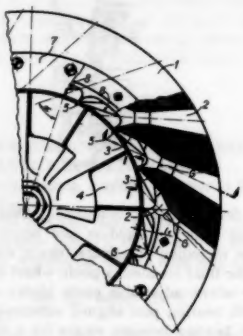
Jan Traczyk; Jacek Brejnak, and Krzysztof Kawalec, all of Warsaw, Poland, assignors to Instytut Lotnictwa, Warsaw, Poland

Filed Feb. 13, 1985, Ser. No. 701,088

Claims priority, application Poland, Mar. 27, 1984, 246883

Int. Cl.[4] F04D *29/44*

U.S. Cl. 415—211 **3 Claims**



1. A supersonic channel diffuser, particularly a radial one, comprising an impeller rotatable about a diffuser axis, and a ring with equally spaced channels surrounding the impeller, wherein inter-channel walls, defined by the shape of the channels, are permanently connected to at least one side wall of the ring, the improvements being characterized in that, on the inlet side of the diffuser, the inter-channel walls, in cross-sections defined by planes passing through the diffuser axis, have a pair of surfaces which are convergent towards the impeller and are terminated with sharp edges close to the center of said cross-sections, and said inter-channel walls have a second pair of surfaces, formed from a side of each of the channels, situated closer to the impeller, which are convergent towards the impeller.

4,696,623

HELICOPTER ROTOR BLADE MADE FROM A MULTISPAR COMPOSITE MATERIAL WITH TORSION COMPARTMENTS AND A PROCESS FOR MANUFACTURING SAME

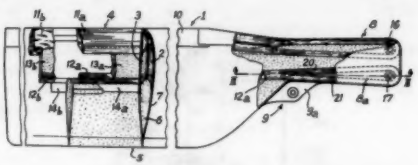
Michel Bost, Val-de-Marne, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Dec. 10, 1985, Ser. No. 807,148

Claims priority, application France, Dec. 19, 1984, 84 19432

Int. Cl.[4] B64C *27/46*

U.S. Cl. 416—230 **5 Claims**



1. A composite material blade for a helicopter rotor comprising a resistant compartmented framework formed in the vicinity of a leading edge of the blade, the resistant compartmented framework being substantially centered at the front quarter of the cross section of the blade, said framework comprising two longitudinal superimposed compartments, each compartment including a front strut and a rear strut, each strut being formed from a bundle of rovings made from resin preimpregnated fibers, a filling core made from a light material disposed between the two struts, and a casing enclosing said struts and said core comprising at least one layer of fabric made from parallel fibers disposed slantwise with respect to the longitudinal axis of the blade so as to form a shell resisting in torsion, the two compartments being joined together by simultaneous ploymerization of the superimposed and jointing parts of their respective casings; a filling element disposed at the rear of the framework; and an external covering covering the whole of the framework and the filling element.

4,696,624

CASING PUMP

Harold E. Bass, and Richard E. Bass, both of Washington, Okla., assignors to Bassco, Inc., Washington, Okla.

Filed Apr. 8, 1987, Ser. No. 37,388

Int. Cl.[4] F04B *47/12; F16J 1/06*

U.S. Cl. 417—56 **22 Claims**

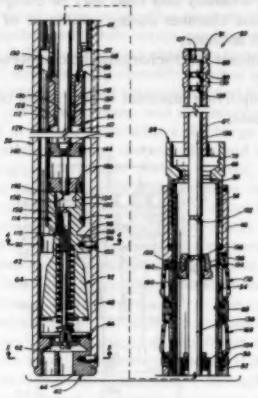
1. A natural gas operated pump for use in the casing of an oil well, comprising:

a tubular pump body having an open lower end for admitting well fluids to the interior of the pump body and an open upper end, wherein a downwardly facing seating surface is formed on the inner periphery of the pump body adjacent the upper end thereof;

means for forming a seal between the pump body and the casing of the well;

a rod extending longitudinally through the seating surface formed in the pump body and protruding from the upper end of the pump body;

a valve member mounted on the rod below the seating surface and shaped to mate with the seating surface; and



means for vertically positioning the rod in proportion to fluid pressure within the pump body.

4,696,625

EJECTOR AND METHOD OF FABRICATION

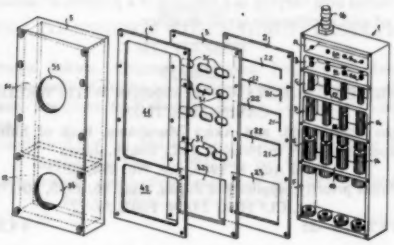
Dan Greenberg, 4 Rehov Haganim, Kiryat Bialik, Israel

Filed Jan. 30, 1986, Ser. No. 824,165

Claims priority, application Israel, Feb. 8, 1985, 74282

Int. Cl.[4] F04F *5/00*; B65B *31/04*; B21D *53/00*

U.S. Cl. 417—174 **7 Claims**



1. Method of producing an ejector device with several ejectors assembled in a first common ejector housing part comprising a multiple number of suction chambers with one side left open, an inlet opening for a pressure medium, a plurality of ejector nozzles in each suction chamber being positioned co-axially one after the other, one of said suction chambers being provided with an evacuation inlet port, the method comprising the steps of producing the first housing part, forming therein the suction chambers, forming holes in the walls of the first housing part and said chambers for accommodation of the ejector nozzles, inserting the ejector nozzles into said holes, covering the open side of the first housing part by means of a flexible cover provided with flaps, placing on top of the flexible cover a plate member with openings, placing a seal member on top of the plate member, placing a second housing part having an inlet port and an outlet port on top of the seal member, and securing the first housing part to said second housing part.

5. An ejector device comprising a first housing part having multiple suction chambers with one side of each of said suction chambers left open, a plurality of ejector nozzles in each suction chamber positioned co-axially one after the other, a flexible cover having flaps abutting said first housing part and covering the open side of said suction chambers, a plate member having multiple openings covering said flexible cover, a seal member covering said plate member, a second housing part having an inlet port and an oulet port covering said seal member, and fastening means for securing said first housing part to said second housing part.

4,696,626

RAILROAD CAR AIR COMPRESSOR UNIT

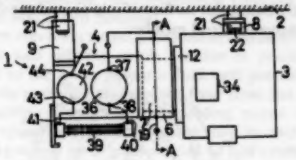
Yasuhisa Hata; Takeshi Hatimaki, both of Akashi, and Satoshi Ogura, Kobe, all of Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Feb. 7, 1986, Ser. No. 827,848

Claims priority, application Japan, Feb. 8, 1985, 60-17472[U]

Int. Cl.[4] F04B *39/16*

U.S. Cl. 417—312 **5 Claims**



1. A motor-driven air compressor unit for a railroad vehicle comprising, an intermediate hollow mounting member having an outer diameter which is smaller than the outer diameter of the motor and the compressor, said intermediate hollow mounting member has an open flange formed on one end, a matching section formed on one end of the motor so that the compressor is connectable to the motor, the drive shaft of the motor and the crank shaft of the compressor are coupled by a coupling located inside of the intermediate hollow mounting member, and a suction filter and a suction muffler are connected to each other by a connecting line, the suction filter is located in a space formed on one side of the outer surface of the intermediate hollow mounting member and adjacent the ends of the motor and the compressor, the suction muffler is located in a space formed on the other side of the intermediate hollow mounting member and adjacent the ends of the motor and the compressor, and the motor and the compressor are suspended beneath the floor of the railroad vehicle by a pair of suspension pieces which are isolated by vibration-absorbing members.

4,696,627

SCROLL COMPRESSOR

Hideo Asano, Gifu; Kazuhisa Makida, and Kenichi Fujiwara, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 15, 1986, Ser. No. 897,021

Claims priority, application Japan, Aug. 15, 1985, 60-178641; Aug. 15, 1985, 60-178642

Int. Cl.[4] F01C *1/02*

U.S. Cl. 418—15 **8 Claims**

1. A scroll compressor comprising:

a housing including therein a suction chamber;

a stationary scroll member fixedly disposed within said housing, said stationary scroll member including a first end plate and a first scroll element projecting from one surface of said first end plate;

a movable scroll member movably disposed within said housing, said movable scroll member including a second end plate and a second scroll element projecting from one surface of said second end plate opposite said one surface of said first end plate;

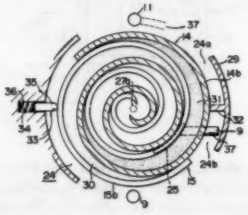
means for driving said movable scroll member to make it revolve around a center axis of said stationary scroll mem-

ber but preventing said movable scroll member from revolving around its own axis;

a plurality of working chamber each defined by said first scroll element and said second scroll element which is angularly offset from and engaged with said first scroll element, a radially outermost working chamber opening to said suction chamber to introduce fluid to be pressurized from said suction chamber, and each of said working chambers moving centripetally and circumferentially, in order while decreasing a volume thereof upon revolution of said movable scroll member; outlet port means for discharging the pressurized fluid from said working chamber, said outlet port means including an outlet port;

a stationary partition extending from an inner wall surface of said housing to a radially outermost surface of said first scroll element of said stationary scroll member;

a movable partition radially reciprocatingly projecting from said inner surface of said housing and abutting against a radially outermost surface of said second scroll element of said movable scroll member;



two suction chamber sections into which said suction chamber is divided by both said scroll members and both said partitions;

first inlet port means having a first inlet port opening to one of said suction chamber sections for introducing thereinto fluid to be pressurized having a first pressure level;

second inlet port means having a second inlet port opening to the other suction chamber section for introducing thereinto fluid to be pressurized having a second pressure level different from said first pressure level; and

sub-suction port means having a sub-suction port for introducing fluid to be pressurized having a third pressure level which is higher than said first pressure level, said sub-suction port means, at an initial stage of a compression process of the fluid having said first pressure level in one of said working chambers, being caused to communicate with said one working chamber into which is introduced the fluid having said third pressure level.

4,696,628

SCROLL-TYPE FLUID TRANSFERRING MACHINE WITH INTAKE PORT AND SECOND INTAKE PASSAGE

Tadashi Kimura; Masahiro Sugihara, and Tsutomu Inaba, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 3, 1986, Ser. No. 847,524

Claims priority, application Japan, May 16, 1985, 60-106304

Int. Cl.⁴ F01C *1/04*

U.S. Cl. 418—15 **3 Claims**

1. A scroll type fluid transferring machine comprising:

a shell;

means for defining a stationary scroll member in said shell;

means for defining an oscillatable scroll member having a wrap cooperating with a wrap of said stationary scroll member to form a compression chamber;

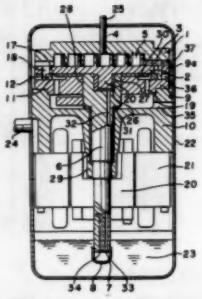
bearing frame means in said shell for supporting said oscillatable scroll member for oscillation;

means for causing said oscillatable scroll member to oscillate, including an oldham's coupling having an oscillating ring member in a recess of said bearing frame means;

intake port means for feeding a fluid to said compression chamber, whereby said fluid may be compressed in said compression chamber during oscillation of said oscillatable scroll member;

outlet port means for discharging the compressed fluid from said shell;

means for supplying lubricant to said recess of said bearing frame means;



means for introducing the fluid into said shell;

means for defining a first passage in said stationary scroll member between a low pressure portion of the interior of said shell in communication with the fluid from said means for introducing and said intake port means; and

means for defining a second passage in said bearing frame means between said low pressure portion of said shell and said intake port means, said second passage having a sectional area varying as a function of a position of oscillation of said oscillatable scroll member.

4,696,629

HERMETIC SCROLL COMPRESSOR WITH WELDED CASING SECTION

Masao Shibayashi, and Akira Murayama, both of Shimizu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 8, 1986, Ser. No. 894,865

Claims priority, application Japan, Aug. 16, 1985, 60-179414

Int. Cl.⁴ F04C *18/04*; F04B *39/12*

U.S. Cl. 418—55 **4 Claims**

1. A hermetic scroll compressor comprising a hermetic casing, a scroll compressor section and an electric motor section both contained in said hermetic casing, said scroll compressor and motor sections being connected with each other through a rotary shaft supported by a frame, a space in said

hermetic casing being separated into upper and lower chambers by said frame, said compressor section including stationary and orbiting scroll members each having a disk-shaped end plate and a spiral wrap protruding upright therefrom and assembled together with their wraps meshing inwardly with each other to define compression chambers therebetween, said orbiting scroll member being operably engaged by an eccentric shaft portion formed on said rotary shaft and being provided with rotation prevention means, said stationary scroll member being formed in its end plate with a discharge port opening through a central portion of the end plate and a suction port opening through a peripheral portion thereof, said orbiting scroll member being driven in orbital motion relative to said stationary scroll member without rotation about its own axis to move said compression chambers toward center of both scroll members with capacity of said compression chambers progressively decreased so that a refrigerant gas drawn through said suction port into said compression chambers is compressed, discharged through said discharge port to said upper chamber and introduced therefrom through a communication passage formed in a peripheral portion of said frame to said lower chamber, in which said electric motor section is disposed, to be delivered to outside of said compressor through a discharge pipe, wherein said hermetic casing has an upper casing section, barrel section and a lower casing section which are formed separately and hermetrically welded together, said barrel section is formed with a sheet material rolled into a cylindrical shape and welded at opposite ends thereof to form a weld joint, and said frame is fixedly secured in said barrel section of said casing with said weld joint on said barrel section disposed within a circumferential width of said communication passage so that entire periphery of said frame except for the portion where said communication passage is formed is in close contact with an inner peripheral surface of said barrel section of said casing.

4,696,630

SCROLL COMPRESSOR WITH A THRUST REDUCTION MECHANISM

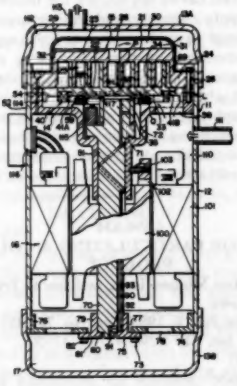
Hirotsugu Sakata, Chigasaki; Shigemi Nagatomo; Makoto Hayano, both of Tokyo, and Mitsuo Hatori, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 655,429, Sep. 28, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 903,872

Claims priority, application Japan, Sep. 30, 1983, 58-180499

Int. Cl.[4] F04C *18/04, 27/00, 29/02*

U.S. Cl. 418—55 **19 Claims**



1. A scroll compressor with a thrust reduction mechanism for compressing gas, said scroll compressor comprising:

(a) a sealed housing having a discharge port and a suction port;

(b) scroll compressing means located between the discharge and suction ports, said scroll compressing means including a stationary scroll member and an orbiting scroll member defining a compressing chamber therebetween which communicates with the discharge port, whereby, during operation, a lower pressure fluid is introduced from the suction port into said sealed housing to fill it with the lower pressure fluid and part of the fluid in said sealed housing is introduced into the compression chamber, compressed therein, and discharged from the discharge port through the discharge outlet;

(c) means arranged in said sealed housing to cause said orbiting scroll member to orbit, thereby compressing the fluid introduced into the compression chamber;

(d) connecting means penetrating said orbiting scroll member to communicate the compression chamber with the inside of said sealed housing;

(e) pressure receiving means provided in said sealed housing adjacent said orbiting scroll member in position to be exposed to the lower pressure fluid, said pressure receiving means receiving compressed fluid from the compression chamber through said connecting means, whereby, during operation, the compressed fluid in said pressure receiving means gives a thrust load to said orbiting scroll member, thereby partially compensating for the force exerted on said orbiting scroll member by the compression chamber;

(f) a frame fixed to said sealed housing to transmit the thrust load to said sealed housing, said frame supporting said pressure receiving means, whereby, during operation, the thrust load applied to said pressure receiving means is transmitted to said sealed housing through said frame; and

(g) supporting means for preventing said pressure receiving means from orbiting together with said orbiting scroll member.

4,696,631

APPARATUS FOR COMPRESSION MOLDING OF COIL END TURNS

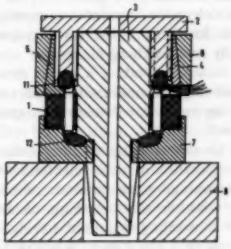
Karl-Heinz Nitt, Wuerzburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich

Filed Sep. 30, 1986, Ser. No. 913,813

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534923

Int. Cl.[4] B29C *43/30*

U.S. Cl. 425—117 **7 Claims**



1. Apparatus for compression molding of coil end turns, which are generally cylindrical and have an inside and an outside and which apparatus includes a form shell that is pressed against the coil end turns, comprising:

an inner form core as a part of the form shell which radially confines the coil end turns on the inside;

a radially advanced outer confining form shell divided into at least two parts in the circumferential direction, which radially confine the coil end turns on the outside;

a compression form shell with an end surface contour for engaging the coil end turns, which compression form shell is advanced axially against the coil end turns;

an outside and an inside circumferential surface of the compression form shell having respective outer and inner guide projections projecting axially in the direction of the coil end turns, said guide projections extending over the outer surfaces and inner surfaces of the coil end turns; and

the outer confining form shell and the inner form core having inner and outer guide recesses, cooperating with the inner and outer guide projections, respectively, into which guide recesses the inner and outer guide projections extend.

4,696,632

MOLD OPENING/CLOSING SPEED CONTROL DEVICE

Yoshiharu Inaba, Kawasaki, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan

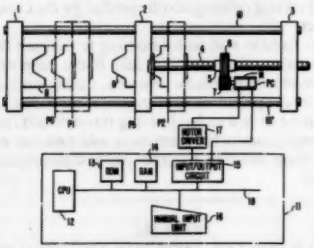
PCT No. PCT/JP84/00618, § 371 Date Jul. 8, 1985, § 102(e) Date Jul. 8, 1985, PCT Pub. No. WO85/02812, PCT Pub. Date Jul. 4, 1985

PCT Filed Dec. 26, 1984, Ser. No. 752,621

Claims priority, application Japan, Dec. 28, 1983, 58-245421

Int. Cl.⁴ B29C *45/80*

U.S. Cl. 425—150 **6 Claims**



1. A mold opening/closing speed control device in an injection molding apparatus having molds, comprising:

teaching/operation mode selecting means, manually operable by an operator, for selecting either a teaching mode for teaching an acceleration/deceleration position of a mold opening/closing speed, or an operation mode for opening/closing molds;

teaching means, manually operable by the operator, for setting the acceleration/deceleration position;

memory means for storing the acceleration/deceleration position set by said teaching means;

mold driving means, including a servo motor as a drive source, for moving the molds with respect to one another;

position detecting means for detecting a moving position of the molds; and

control means for determining whether either the teaching mode or the operation mode is selected by manual operation of said teaching/operation mode selecting means, for determining whether said teaching means is manually operated, for controlling said mold driving means to cause the molds to move at a low speed when said control means determines that the teaching mode is selected, for controlling said memory means to store therein a mold position detected by said position detecting means at the time said control means determines that the teaching mode is selected and that said teaching means is manually operated, and for controlling said mold driving means so that the opening/closing speed of the molds is controlled in accordance with the mold position stored in said memory means when said control means determines that the operation mode is selected.

4,696,633

MELT SPINNING APPARATUS

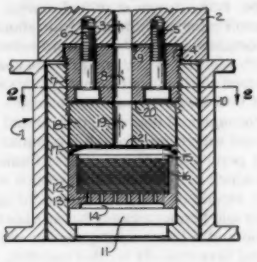
Erich Lenk, and Max Feth, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 593,034, Mar. 23, 1984, Pat. No. 4,645,444. This application May 24, 1985, Ser. No. 738,170

Claims priority, application Fed. Rep. of Germany, May 26, 1984, 3419772

Int. Cl.⁴ D01D *4/08*

U.S. Cl. 425—192 S **8 Claims**



1. A melt spinning apparatus for extruding and spinning a thermoplastic material and comprising

a stationary melt supply assembly having a cylindrical connecting plug directly mounted thereto, and with a melt supply line extending through said melt supply assembly and said connecting plug,

a nozzle assembly including a spin plate having a plurality of openings extending therethrough, and a tubular casing having a cylindrical internal bore portion and enclosing and supporting said spin plate and so as to define a cavity on one side of said spin plate,

thread means on said internal bore portion of said casing and said cylindrical connecting plug for releasably interconnecting said casing to said connecting plug and such that said melt supply line communicates with said cavity and thus one side of said spin plate, and such that the nozzle assembly may be readily disassembled from said melt supply assembly by rotation of said casing with respect to said connecting plug, and

means mounted within said cavity between said connecting plug and said spin plate and operable by the pressure of the melt in said cavity for sealing the nozzle assembly to said melt supply assembly, said sealing means including a piston mounted in said cavity for axial movement in a direction between said connecting plug and said spin plate, said piston having an opening extending therethrough and which is in alignment with said melt supply line, and diaphragm means positioned in said cavity between said piston and said spin plate for biasing said piston against said connecting plug upon pressurized melt being received in said cavity.

4,696,634

APPARATUS FOR PARTICULATING AN OLEAGINOUS PRODUCT

Zellis C. Zeller, Des Moines, Iowa, assignor to Triple "F", Inc., Des Moines, Iowa

Filed Jun. 6, 1985, Ser. No. 741,859

Int. Cl.⁴ B29C *43/46, 47/00*

U.S. Cl. 425—237 **3 Claims**

1. In an extruder machine for processing an oleaginous product under conditions of pressure and heat having a discharge outlet and wherein the product on admission into the atmosphere is cooled and expanded and a product forming unit having rolls for receiving the product from said outlet while

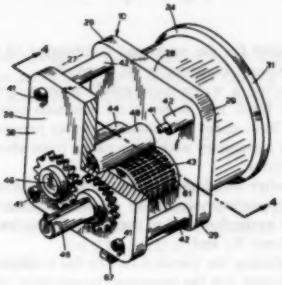
under said pressure and heat conditions the improvement comprising:

(a) a housing having an elongated product receiving chamber means with an inlet and an elongated outlet,

(b) means mounting said housing on said extruder machine with said inlet open to said discharge outlet, said inlet being at an end of said chamber means adjacent one of the ends of said rolls so that there is movement of the product through said chamber in a direction axially of said rolls,

(c) a pair of like said rolls in said housing having peripheral contact in a linear zone located in a plane common to the axes of said rolls,

(d) means rotatably supporting said rolls so that opposed peripheral portions thereof movable toward each other in



a direction toward the linear contact zone are in contact engagement with said chamber means at opposite sides of said elongated outlet to provide a trough from said elongated outlet to said contact zone, and

(e) means on said housing for confining the product in said trough within the axial length of said rolls, whereby the product under substantially the pressure and heat conditions at said discharge outlet is directed through said chamber means and trough into the rolls contact zone,

(f) with one of said rolls having mold cavities in the peripheral surface thereof into which the product is pressed at said contact zone, said product on travel into the atmosphere from said contact zone being expanded and self-ejected from said cavities in the form of said mold cavities.

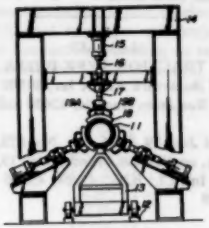
4,696,635

APPARATUS FOR FORMING UNEVENNESS ON AN OUTER SURFACE OF A SYNTHETIC RESIN-COATED STEEL PIPE

Teruo Ohtani; Toshihisa Tamura; Yuji Ikeda; Mutsuya Araikawa, and Kazuyoshi Kywata, all of Aichi Pref., Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Continuation of Ser. No. 712,451, Mar. 13, 1985, abandoned, which is a continuation of Ser. No. 474,549, Mar. 11, 1983, abandoned. This application May 9, 1986, Ser. No. 862,165
Claims priority, application Japan, Mar. 16, 1982, 57-40258
Int. Cl.[4] B29C *59/02*
U.S. Cl. 425—330 **2 Claims**

1. Apparatus for forming an uneven outer groove and ridge surface on synthetic resin coated steel pipe, comprising a housing, moving-means for transporting said pipe, a plurality of urging means supported by said housing and directed toward the center of the pipe, working tool means flexibly connected to and supported by said urging means for contact engagement with the circumferential surface of said pipe, said working tool means being disposed longitudinally with respect to the pipe and having a concave inner surface in the shape of a cylindrical segment formed with a pattern of groove portions and ridge portions, heater means disposed within each of said working tool means, said working tool means having supporting leaf spring members connected to the urging means so that the



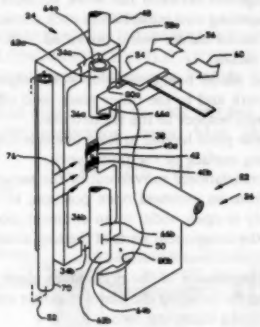
working tool means flexibly conform to the curved surface of the pipe.

4,696,636

THERMOPLASTIC CONTAINER FORMING APPARATUS

William W. Evely, Chardon, Ohio, assignor to Ball Corporation, Muncie, Ind.

Division of Ser. No. 714,733, Mar. 22, 1985, Pat. No. 4,650,628.
This application Oct. 27, 1986, Ser. No. 923,464
Int. Cl.[4] B29C *49/04*
U.S. Cl. 425—526 **24 Claims**



1. Apparatus for producing thermoplastic containers, which apparatus comprises:

extruding means, comprising a crosshead, for extruding thermoplastic tubing along a first axis that lies in a first plane;

severing means for severing a parison tube from said thermoplastic tubing that includes a first end, a first holding portion, a first body portion, and a neck and moil portion;

blow mold means, comprising a blow mold having first and second mold halves, having a first holding cavity, and a first body cavity, and having a neck and moil cavity, for opening and closing said cavities by relative movement of said mold halves along a second axis that is substantially orthogonal to said first axis and that is substantially orthogonal to said first plane, for grasping said first holding portion of said parison tube in said first holding cavity, for enclosing said first body portion in said body cavity, for enclosing said neck and moil portion in said neck and moil cavity, and for blow forming a first container;

actuating means, for actuating said halves of said blow mold to an open position wherein said blow mold receives said parison tube, to intermediate positions wherein said first holding cavity grasps said first holding portion of said parison tube, and to a closed position; and

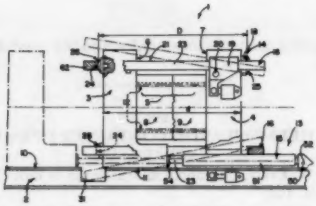
means for applying a transverse force to said parison tube for straightening said parison tube prior to completion of said closing of said blow mold.

4,696,637

TRACTION TYPE PRESS

Guy Rivière, 382 Boulevard Albert 1er, 59500 Douai, and Jean P. Luczak, 34, Rue Jules Guesole, 62430 Sallaumines, both of France

Filed Jun. 19, 1986, Ser. No. 875,998
Claims priority, application France, Jun. 19, 1985, 85 09674
Int. Cl.[4] B29C *45/64, 45/66*
U.S. Cl. 425—589 **11 Claims**



1. Traction type press comprising a rigid framework and at least two plates having work surfaces, of which is a mold assembly disposed between the work surfaces, said mold assembly comprising two mold halves each carried by one of the plates, said mold halves being provided with their own self positioning means;

one of the plates being movable with respect to the rigid framework and to the other plate, said other plate being fixed with respect to the framework,

the movable plate having at least one side for moving along a bearing surface of the framework,

wherein translational movement of the movable plate takes place from an endmost open position, in which the tool assembly is open wide, to an endmost closed position in which the component parts of the tool assembly cooperate closely,

wherein the closure of the press takes place in two steps, a first step for bringing the plates together and a second step for applying clamping force,

wherein the press uses separate means for carrying out the first and second steps, the press having an approach means providing rapid movement over a large distance but without a high force to accmplish the first step, and a clamping means providing movement over a short distance and developing the clamping force to accomplish the second step, press:

and wherein the action of the clamping means is retransmitted from one of the plates to the other by at least one clamping structure which consists substantially of a rigid substantially rectangular frame of inner dimensions sufficient for passing with play about the fixed and movable plates, said frame comprising longitudinal members each situated on one side of the press and two transverse beams situated behind the fixed and movable plates where said transverse beams form bearing element with the fixed movable plates,

each clamping structure being attached to one of the plates by a pivoting means, the press further comprising a means for controlling swinging of the clamping structure so as to free a corresponding bearing element from the opposite plate and allow opening of the press,

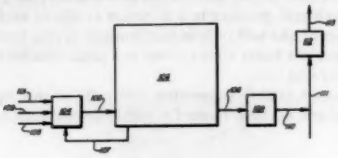
and wherein the clamping means bears directly on one of the plates and on the bearing element of the transverse beam situated behind said one of the plates.

4,696,638

OIL FUEL COMBUSTION

Marvin J. DenHerder, 816 Brookwood Dr., Olympia Fields, Ill. 60461

Filed Jul. 7, 1986, Ser. No. 882,806
Int. Cl.[4] F23J *7/00*; C10L *1/32*
U.S. Cl. 431—4 **23 Claims**



1. A process for the improved combustion of oil fuels in a combustion zone, comprising the steps of:

(a) preparing a water-in-oil emulsion in a combustible oil carrier fluid, said water-in-oil emulsion containing from about 20 to about 90 volume % water present as droplets having a diameter within the range from about 1 to about 10 microns;

(b) thereafter blending the water-in-oil emulsion into the fuel in a proportion selected to provide a water content dispersed in the fuel within the range from about 2 to about 10 volume %; and

(c) introducing the blended fuel to the combustion zone.

22. Apparatus, for the improved preparation of water-in-oil emulsions for use in the combustion of oil fuels in a combustion zone, said emulsions containing water droplets having an average diameter within the range from about 1 to about 10 microns, comprising:

(a) an emulsification vessel, affording means for the preparation of a water-in-oil emulsion;

(b) separate metered lines for feeding, respectively water, combustible oil carrier fluid, and emulsification additive to the emulsification vessel;

(c) an emulsion holding tank;

(d) cycling means for the circulation of water-in-oil emulsion between the emulsification vessel and the emulsion holding tank;

(e) an oil fuel blending zone;

(f) first delivery means, for the metered delivery of the water-in-oil emulsion to the oil fuel blending zone; and

(g) second delivery means, for the transfer of blended emulsion and oil fuel from the blending zone to the combustion zone, or optionally, to an intermediate storage zone.

4,696,639

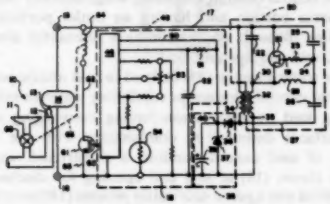
SELF-ENERGIZING BURNER CONTROL SYSTEM FOR A FUEL BURNER

John E. Bohan, Jr., Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 6, 1986, Ser. No. 927,485
Int. Cl.[4] F23Q *9/08*
U.S. Cl. 431—59 **9 Claims**

1. A self-energizing burner control system for burner means having a pilot burner and a main burner, including: thermoelectric generator means responsive to a flame from said pilot burner to generate a direct current potential; fuel valve means for controlling fuel to said main burner; solid state switch means and said fuel valve means connected in series to said direct current potential wherein the operation of said solid state switch means controls said direct current potential to in turn control said valve means; oscillator means including connection means connecting said oscillator means to said direct current potential to energize said oscillator means to produce an alternating current output voltage; voltage step-up means having an input responsive to said oscillator means output voltage, and an output connected to rectifier and capacitor

means to provide a direct current power supply; solid state temperature control means energized from said direct current power supply means; said solid state temperature control means including a temperature sensor and said temperature



control means having an output connected to said solid state switch means; said solid state temperature control means controlling said solid state switch means to operate said valve means.

4,696,640

FORTUNE CANDLE

Thomas E. Pitchford, Box 21, Napolean, N. Dak. 58561

Filed Mar. 19, 1986, Ser. No. 841,151

Int. Cl.[4] F23D *3/16*

U.S. Cl. 431—289 **1 Claim**

1. A candle having a hidden presealed surprise message therein, comprising a candle having a wick, and a top and bottom, said candle having an outer periphery, a sealed packet having an interior chamber, said sealed packet being made of non-flamable material that protects the interior from heat of the candle and being manually openable, said packet being completely enclosed within the candle periphery at a location spaced upwardly from the bottom of the candle initially and positioned to be exposed as the candle is consumed, and a message containing sheet separate from the packet, contained in the interior chamber of the packet.

4,696,641

PRIMER MATERIAL AND PHOTOFLASH LAMP

John W. Shaffer, Montoursville, and Ronald E. Sindlinger, Muncy, both of Pa., assignors to GTE Products Corporation, Danvers, Mass.

Filed Aug. 11, 1986, Ser. No. 895,555

Int. Cl.[4] F21K *5/02*

U.S. Cl. 431—362 **24 Claims**

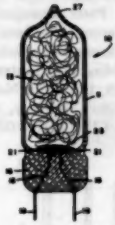
1. A primer material for a photoflash lamp comprising a mixture of a combustible metal powder, part of said powder being in large particle form; an oxidizer; a binding agent; and solid electrically insulating beads, said beads being coated with a layer of friction-reducing material.

11. A high-voltage photoflash lamp comprising:

an hermetically-sealed light-transmitting envelope including a combustion-supporting atmosphere therein;

a quantity of filamentary combustible material located within said envelope;

ignition means for igniting said combustible material, said ignition means including a pair of electrical conductors sealed within said envelope and projecting therefrom, each of said conductors including an end portion having access to the interior of said envelope;



a mass of primer material located within said envelope in electrical contact with said end portions of said electrical conductors, said primer material comprising a mixture of a combustible metal powder, part of said powder being in large particle form; an oxidizer; a binding agent; and electrically insulating beads, said beads being coated with a friction-reducing material.

4,696,642

APPARATUS FOR CONTINUOUSLY HEATING AN ELONGATED TEXTILE ARTICLE

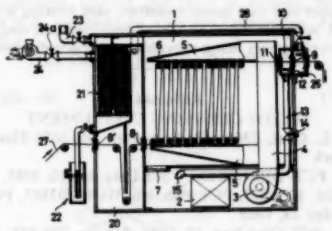
Keizo Hatta, Uozu, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed May 1, 1986, Ser. No. 857,963

Claims priority, application Japan, May 15, 1985, 60-71889[U]

Int. Cl.[4] F27B *9/28*

U.S. Cl. 432—59 **1 Claim**



1. An apparatus for continuously heating an elongate textile article, comprising: a heating chamber divided into a pair of upper and lower sections, said upper chamber section having an inlet at one side for continuously introducing the textile article into said heating chamber, and an outlet at the other side for continuously discharging the textile article out of said heating chamber; a heater mounted in said lower chamber section for heating air therein; a heated-air circulating system for continuously transmitting the heated air from said lower chamber section to said upper chamber section; a box mounted on said heating chamber at least at one of said inlet and outlet so as to cover the same and having a slit for passage of the textile article, said box having therein an eave-like baffle partition disposed between said slit and said one end of said pipe, said eave-like partition being coextensive with the width of said box and projecting from an inner wall of said box toward and terminating short of an outer wall of said heating chamber;

and a pipe opening at one end into said box and at the other end toward an upstream side of said heater, said one end of said pipe being disposed centrally in a bottom of said box so as to lie under said eave-like partition.

4,696,643

PROCESS AND APPARATUS FOR HEATING OF PASTY MATERIALS

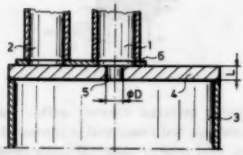
Péter Szody, Nagykata; Péter Dunajcsik, Budapest; Miklós Villányi, Budapest; Ferenc Bossánszky, Budapest; Endre Libor, Budapest, and Ferenc Kiss, Budapest, all of Hungary, assignors to Budapest Muszaki Egyetem, Budapest, Hungary

Filed Mar. 25, 1985, Ser. No. 716,786

Claims priority, application Hungary, Apr. 2, 1984, 1315/84

Int. Cl.[4] F27B *9/00*

U.S. Cl. 432—120 3 Claims



1. Apparatus for the heating of pasty materials with surface heating and infusion type heating, comprising a heating chamber for the material to be processed, a steam chamber, an infusion chamber, a space divider, said space divider being arranged between said chambers, a plurality of through holes, said through holes being formed in said space divider for selectively interconnecting at a time the infusion chamber with either the heating chamber or with the steam chamber, said space divider thereby acting as a heat exchanger between the said chambers, said heating chamber and said steam chamber being arranged vertically above the infusion chamber for enhancing the drop formation of the pasty material during the feeding thereof into said infusion chamber, said through holes communicating at one time only with one of said chambers, a sliding member for providing a connection between said heating chamber and said steam chamber, said heating and steam chambers being arranged on said sliding member, said heating and steam chambers being movable said space divider.

4,696,644

TOOTH CLEANING INSTRUMENT

Sven K. L. Goof, 236A, Gl. Strandvej, DK-3050 Humlebaek, Denmark

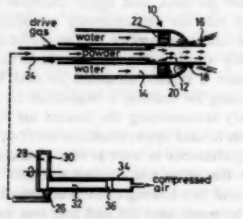
PCT No. PCT/DK84/00106, § 371 Date Jul. 10, 1985, § 102(e) Date Jul. 10, 1985, PCT Pub. No. WO85/02107, PCT Pub. Date May 23, 1985

PCT Filed Nov. 12, 1984, Ser. No. 758,672

Claims priority, application Denmark, Nov. 11, 1983, 5176/83

Int. Cl.[4] A61C *3/02*

U.S. Cl. 433—88 4 Claims



1. An instrument for discharging powdered abrasive and water for cleaning surfaces, especially tooth surfaces, said instrument comprising

a handpiece having a distal nozzle portion (**10**) defining an end opening,

a central conduit (**12**) for conducting abrasive material and gas, said central conduit extending longitudinally through said nozzle portion and having an outlet portion (**16**) protruding through, and extending a substantial distance beyond, said end opening, and

an annular water passage (**14**) defined in said nozzle portion about said central conduit for supplyiing water to said end opening, said nozzle portion having converging inside wall surfaces defining, in combination with the outer surface of said central conduit, a constricted, annular throttle throat (**18**) at said end opening for discharging water about and against said outlet portion (**16**) protruding through and beyond said end opening.

4,696,645

APPARATUS FOR REMOVING PLAQUE AND STAINS FROM THE SURFACES OF TEETH

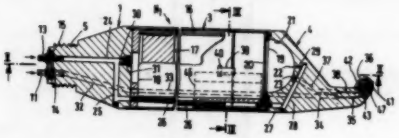
Martin Saupe, Offenbach; Hans Dauernheim, Dreieich, and Maximillian Markl, Königstein, all of Fed. Rep. of Germany, assignors to Emda Fabrik Elektro-Medizinischer und Dentaler Apparate Georg Hartmann GmbH & Co. KG, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 24, 1985, Ser. No. 790,731

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1984, 3439584

Int. Cl.[4] A61C *3/00*

U.S. Cl. 433—125 26 Claims



1. Apparatus for removing plaque and stains from the surfaces of teeth with a jet containing a mixture of flowable solid particles and a gaseous medium, comprising a hollow housing constituting a handle and includinga nozzle having at least one orifice arranged to discharge the mixtures against the teeth, and a receiving portion having an inlet connectable with a source of pressurized gaseous medium, said housing having a vortex chamber in communication with said inlet and said orifice; and a container for a supply of flowable solid particles in said housing, said container having outlet means for addission of flowable solid particles into said chamber, and said housing further including a foraminous partition which is interposed between the outlet means of said container and said chamber.

4,696,646

DENTAL WEDGE AND METHOD OF USING SAME

Ronald I. Maitland, 155 East Fifty-fifth St., New York, N.Y. 10022

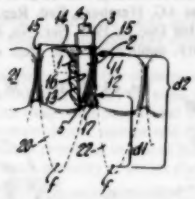
Filed Dec. 23, 1985, Ser. No. 812,350

Int. Cl.[4] A61C *7/00*

U.S. Cl. 433—149 24 Claims

1. A device for dental restoration which assures sufficient separation to provide firm and properly located interproximal contact, comprising a wedge of highly crush resistant and wear resistant dental cured restorative composite resin for insertion into a prepared cavity within a tooth adapted to be filled with uncured restorative composite resin, the wedge being shaped to frictionally engage at least one wall of the cavity so that the

wedge can be inserted into the uncured resin where said wedge remains, the uncured resin containing the wedge can be cured,



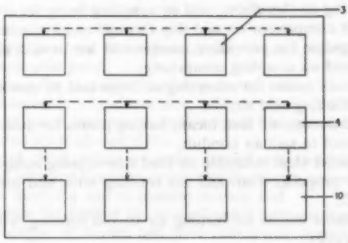
and the cured resin can be finished to an appropriate anatomical shape.

4,696,647

ELECTRONIC ASSEMBLY TOY

Shamoon Ahmad, 829 A. Donaldson Ave., Highland Park, N.J. 08904

Filed Feb. 20, 1986, Ser. No. 831,187
Int. Cl.[4] G09B *19/00*
U.S. Cl. 434—224 **4 Claims**



1. An electronic circuit educational device including,
base means containing an electronic circuit with designed open circuits;
said base means containing an electronic circuit with designed open circuits;
said base means futher including a plurality of differently shaped slots physically located at each open circuit location;
a plurality of eletronic component block means, certain of said means containing therein working electronic components, other of said block means containing non-working electronic components, said block means shaped to fit correspondingly shaped slots in said base means;
whereby, when all said blocks have been inserted into their proper shaped slots, a working electronic device or circuit is obtained.

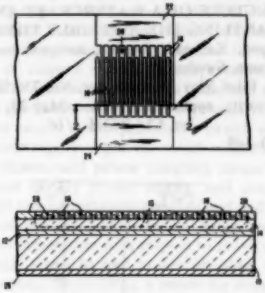
4,696,648

HETEROSTRUCTURE INTERDIGITAL HIGH SPEED PHOTOCONDUCTIVE DETECTOR

Charles W. Slayman, Newbury Park, and Luis Figueroa, Woodland Hills, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 559,509, Feb. 27, 1984, Pat. No. 4,593,304. This application Feb. 11, 1986, Ser. No. 828,406
Int. Cl.[4] H01L *21/283, 21/12, 31/02*
U.S. Cl. 437—5 **10 Claims**

1. A process for fabricating at least one high speed photodetector responsive to incident optical radiation comprising:
(a) providing a substrate of semiconductor material;
(b) forming on at least a portion thereof an isolation layer of semiconductor material;
(c) forming on said isolation layer an active layer of semiconductor material having a bandgap less than that of said semiconductor material comprising said isolation layer;
(d) forming on said active layer a passivation layer of semiconductor material having a bandgap greater than that of said semiconductor material comprising said active layer;
(e) patterning and etching said passivation layer to provide exposed portions of said active layer which define interdigitated electrode regions and transmission line regions; and



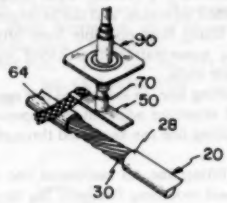
(f) forming a pair of interdigitated electrically conducting electrodes in said interdigitated electrodes regions on the exposed portions of said active layer so as to be non-blocking to majority and minority carriers in said active layer, at least one of said electrodes forming a Schottky-barrier contact to said active layer, the thickness of said active layer being approximately equal to or less than the spacing between said electrodes; and
(g) forming a transmission line connected to each electrode in said transmission line regions.

4,696,649

IN-LINE CONNECTOR

Adam Smorzaniuk, Oxford, and Larry N. Siebens, Whippany, both of N.J., assignors to Amerace Corporation, Hackettstown, N.J.

Filed Oct. 18, 1985, Ser. No. 781,022
Int. Cl.[4] H01R *4/66*
U.S. Cl. 439—98 **17 Claims**



1. A surface mounted grounding device for coupling a grounding conductor to the shield of a jacketed high-voltage electrical cable comprising metallic contact means for engaging and making electrical contact with the bared portion of the electrically conductive shield of a jacketed high-voltage electrical cable from which a portion of the jacket has been removed; coupling means connected to said contact means for receiving and making electrical contact with a grounding conductor; a conformable preformed liquid sealing form positioned over at least a portion of said contact means, said coupling means and adjacent one end of said grounding conductor; and flexible sealing means for tightly uniting said preformed

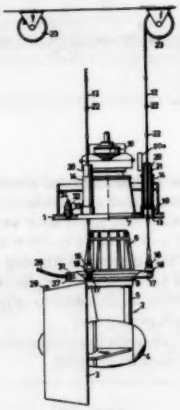
liquid sealing form about said contact means, said grounding conductor and said coupling means to provide a liquid-tight seal about the joint between said grounding conductor and said electrically conductive shield of a jacketed high-voltage electrical cable.

4,696,650

ARRANGEMENT FOR FITTING A PROPELLER ASSEMBLY TO AN OPENING IN A BOTTOM STRUCTURE OF A WATERCRAFT AND FOR DISMANTLING THE ASSEMBLY THEREFROM

Kjell Haglund, Karlstad, Sweden, assignor to Kamewa AB, Kristinehamn, Sweden

Filed May 21, 1985, Ser. No. 736,532
Claims priority, application Sweden, May 23, 1984, 8402793
Int. Cl.[4] B63H *1/14*
U.S. Cl. 440—49 **11 Claims**



1. An arrangement for mounting and dismounting a thruster propeller unit in an opening located in a bottom part of a shell structure of a watercraft, externally of said shell structure and beneath the surface of the water in which the craft floats, said thruster propeller unit being provided with a mounting flange which can be fastened in a pressure-tight fashion around said opening in said shell structure, and the arrangement including

a plurality of lifting lines operable from lifting devices located in the watercraft and provided with connection means at their ends,

for each said lifting line, an associated line opening arranged in said shell structure adjacent said opening so that the associated lifting line can be passed through each said line opening,

for each said lifting line, an associated line attachment arranged on said mounting flange of the thruster propeller unit so that, when the propeller unit is mounted in position by being connected to said shell structure via said mounting flange, each said line attachment is located in the associated line opening and is accessible from the inside of the shell structure,

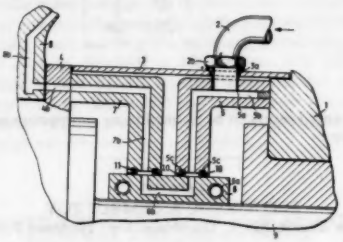
wherein said connection means at the end of each said associated lifting line can be connected to and disconnected from said line attachment from inside the shell structure, and each said line attachment is provided with sealing means for sealing the associated line opening when the propeller unit is in its mounted position, said sealing means being located externally of the connection between the line attachment and the connection means on the end of the lifting line.

4,696,651

APPARATUS FOR A SHIP'S PROPELLER

Harry Wagemann, Hamburg, Fed. Rep. of Germany, assignor to Blohm & Voss AG, Hamburg, Fed. Rep. of Germany

Filed Dec. 3, 1985, Ser. No. 804,279
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1984, 3444084
Int. Cl.[4] B63H *1/28*
U.S. Cl. 440—88 **14 Claims**



1. An air coupling for a propeller of a ship, said propeller having propeller blades, which propeller blades have means for ejecting air therefrom, said air coupling being for connecting an air compressor on said ship through an air conduit with said propeller for providing compressed air to said ejecting means, said air coupling comprising:

stationary means for accepting air from said air conduit and for feeding said air;

said stationary aid feed means having means for attachment thereof to said air conduit;

a propeller shaft rotatable air feed sleeve being mounted on said propeller shaft and for rotating with said propeller shaft;

a rotatable means for feeding air to and rotating with said propeller;

said sleeve for accepting air from said stationary means and feeding air to said rotating means when installed, said stationary means having means for feeding air to said rotatable air feed sleeve when installed;

said sleeve having means for feeding air from said stationary means to said rotatable means, and said rotatable means having means for feeding air from said sleeve to said propeller;

said stationary means and said sleeve and said rotating air feed means for being disposed when assembled to feed air from said stationary means through said propeller shaft rotatable sleeve to said rotating air feeding means and to said propeller and

said stationary means, said rotating means and said rotating sleeve each comprising at least two parts each, each of said at least two parts of each of said stationary means, said rotating means and said rotating sleeve each having adjacent surfaces when installed.

4,696,652

PORTABLE, FOLDABLE REPLICA OF A FACADE OF COMMERCIAL ESTABLISHMENTS

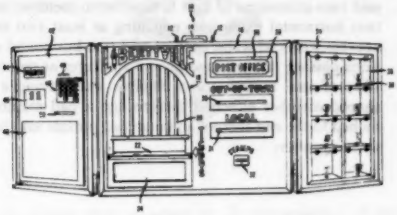
James A. Reeder, and Joanne E. Reeder, both of 101 Roxie Ave., North Beach, N.J. 08008

Filed Jun. 19, 1986, Ser. No. 876,378
Int. Cl.[4] A63H *33/04, 3/52*
U.S. Cl. 446—75 **14 Claims**

1. A replica device of commercial establishments and with said device providing a portable case and in an opened condition for use as a toy for children, said case in a closed condition providing an interior cavity for protection and storage of loose components used therewith, said device including:

(a) a main panel member having an outwardly- and an inwardly-disposed portion;

(b) right- and left-panel portions hingedly attached to main-panel portion and with limiting means associated with the main panel and hinged panels to establish the outward and open swing of each hinged panel to a predetermined extent;
(c) a window formed in the main panel member;
(d) a counter shelf disposed substantially normal to said main panel member;
(e) a box door associated with the main panel;
(f) means for securing and displaying signs selectively indicating the replica usage and below said sign display providing slots for main drops, stamps and the like;
(g) a plurality of doors provided in one of hingedly-attached panel portions, each plurality of doors disposed for selective individual opening;



(h) day, date and like indicia display means provided on a removable panel;
(i) means for moving of said box door;
(j) detachable containers attachable to the interior of the main panel member so as to receive and retain items inserted through said slots;
(k) bank teller replica apparatus carried so as to be simulated and actuated from the exterior of the device and with slots for receiving and dispensing money, and
(l) means for folding the several panel portions into a suitcase-type of device and with selectively operable latch means for retaining said device in a closed condition until openingand using said device is desired.

4,696,653

SPEAKING TOY DOLL

James McKeefery, Milpitas, Calif., assignor to Worlds of Wonder, Inc., Fremont, Calif.

Filed Feb. 7, 1986, Ser. No. 827,812
Int. Cl.[4] A63H *3/28*
U.S. Cl. 446—175 **8 Claims**

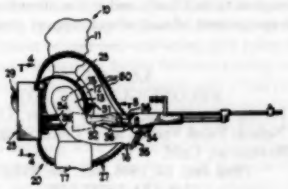
1. A toy comprising:
a body assembly having an at least partially flexible outer covering with an appearance simulating at least some life like features,
a plurality of switch means within said body assembly, each of said switch means being covered by said outer covering of one of said life like features so as to provide a switch signal response to a person's touching of the respective life like feature,
voice synthesizing means for electrical synthesizing any of a plurality of words responsive to control signals provided thereto, said voice sythesizing means including speaker means for audibilizing said electronically synthesized words, and sequencing means coupled between said plurality of switch means and said voice synthesizing means, said sequencing means being a means for providing a sequence of control signals to said synthesizing means responsive to said switch means to cause said synthesizing means to synthesize a sequence of words responsive to which said switch means provided a switch signal,
a battery power supply, a gravity switch means and a power coupling means, said power coupling means being coupled to said battery power supply, said gravity switch means, said voice synthesizing means and said sequencing means, said gravity switch means being responsive to motion and orientation with respect to gravity to provide a tilt switch signal to said power coupling means, said power coupling means being a means for coupling power to said voice synthesizing means and said sequencing means responsive to said tilt switch signal, said power coupling means being responsive to said voice synthesizing means so as to decouple power to said voice synthesizing means and said sequencing means upon the prolonged absence of a synthesized word therein,
a microphone in said body assembly coupled to said sequencing means, said microphone being responsive to sounds orriginating from other than said toy, said sequencing means also being responsive to said microphone to cause said synthesizing means to synthesize a sequence of words upon said microphone detecting sounds followed by an apparent absence of sounds for a predetermined period of time, said power coupling means coupled to said microphone, said power coupling means being responsive to said microphone so as to decouple power to said voice synthesizing means upon the prolonged absence of activation of said microphone.

4,696,654

AMMUNITION BELT ADVANCING ATTACHMENT FOR TOY FIGURES

Bennie R. Welch, Chicago; Russell G. Rasmussen, Skokie, and Harry Disko, South Barrington, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 6, 1986, Ser. No. 827,246
Int. Cl.[4] A63H *5/04*
U.S. Cl. 446—268 **18 Claims**



1. An attachment for a toy figure comprising:
a weapon attachable to the figure in a firing position;
a slot extending through the weapon;
a flexible belt having simulated ammunition on one side of the belt;

the belt being received in the slot for movement through the slot;

means mountable on the figure and cooperating with the belt to move the belt through the weapon;

the moving means including a gear with teeth engaging the simulated ammunition; and

teeth on the gear generally diametrically opposite the teeth engaging the ammunition being engagable by part of a child's hand to rotate the gear and move the belt.

4,696,655

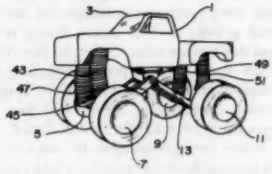
TOY VEHICLE WITH ADJUSTABLE SUSPENSION SYSTEM

Bruce M. D'Andrade, 3 Ten Eyck Rd., Whitehouse Station, N.J. 08889, and Joseph A. Marino, P.O. Box 306, South Ryland Rd., Whitehouse, N.J. 08888

Filed Aug. 15, 1986, Ser. No. 896,645

Int. Cl.[4] A63H *3/20, 17/26*

U.S. Cl. 446—330 **15 Claims**



1. A toy vehicle, comprising:

(a) a vehicular-type body;

(b) two wheels on a single axis and at least one other wheel;

(c) wheel support means having a movable component with an upper end and a lower end, said movable component of said wheel support means being movably connected to said body at its upper end and being connected to said two wheels on a single axis at its lower end so as to permit movement of said two wheels on a single axis, said movable component being hingedly connected to said body at approximately the center of the underside of said body; and,

(d) a suspension system containing at least one hollow tube of thermoplastic material having a flexible zone intermediate the ends thereof, said flexible zone having a plurality of circumferential corrugations extending along its length and having a close-packed position in which they adjoin, the hollow tube being stretchable to sequential lengths until the corrugations assume a longitudinally spaced position, the wall thickness throughout the corrugations being substantially uniform, with said corrugations having side walls, one of which is long and the other of which is short, both of which extend at an acute angle with respect to the axis of said hollow tube, said tube being connected at one end to said body and at the other end to said movable component of said wheel support means.

4,696,656

RECONFIGURABLE TOY

Ronald Torres, Pico Rivera; Edward Mayer, Los Angeles, and Steve Nelson, Palos Verdes, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 14, 1986, Ser. No. 818,839

Int. Cl.[4] A63H *3/46*

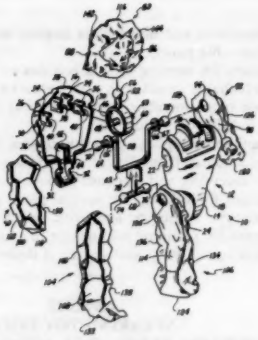
U.S. Cl. 446—376 **3 Claims**

1. A reconfigurable toy comprising:

a hollow torso member having a slot at one end thereof, a plurality of apertures at both sides thereof, an outside surface simulating a torso of a robotic humanoid figure and an outside surface simulating a rock surface, said hollow torso member having a plurality of webs with apertures and two extensions with slots attached to inside surfaces thereof;

a head retainer rotatably mounted inside said hollow torso member, said head retainer having side pins rotatably engaging at least two of said apertures of said webs and a pin extending through said slot of said hollow torso member, said pin having a ball member attached to the end thereof and disposed outside said hollow torso member;

a Y-shaped leg and arm retainer mounted inside said hollow torso member, said leg and arm retainer having (a) a horizontal member extending through one of said apertures at each side of said hollow torso member with ball members attached to the ends thereof and disposed outside said torso member, (b) a plate engaging said slots of said two extensions of said hollow torso member and (c) two horizontal extensions engaging at least two of said apertures of said webs, each of said two horizontal extensions passing through one of said apertures at one of said sides of said hollow torso member and having a disk-shaped member attached thereto and a ball member attached to the end thereof and disposed outside said hollow torso member;



a head member having a surface simulating a face of a robotic humanoid figure and a surface simulating a rock surface, said head member being rotatably coupled to said head retainer by said ball member of said head retainer which operably engages a cylindrical bore and spherical socket in said head member;

two arm members each having a surface simulating an arm of a robotic humanoid figure and a surface simulating a rock surface, each of said arm members being rotatably coupled to said Y-shaped leg and arm retainer by one of said ball members attached to said two horizontal extensions which operably engages a cylindrical bore and spherical socket in each of said arm members; and

two leg members each having a surface simulating a leg of a robotic humanoid figure and a surface simulating a rock surface, each of said leg members being rotatably coupled to said Y-shaped leg and arm retainer by one of said ball members attached to said horizontal member which operably engages a cylindrical bore and spherical socket in each of said leg members.

4,696,657

ELASTIC SHAFT COUPLING FOR TRANSMISSION OF TORQUE BETWEEN SHAFTS

Rolf Johnen, Bergisch-Gladbach; Hans Kirch, Burscheid, and Volkmar Otto, Leverkusen, all of Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany

Filed Aug. 8, 1985, Ser. No. 763,970

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429519

Int. Cl.[4] F16D *3/68*

U.S. Cl. 464—93 3 Claims

1. An elastic shaft coupling for the transmission of torque between a drive shaft and a driven shaft, comprising:

a polygonal rubber ring;

a hub spider having an inner circumference and a plurality of radially extending arms vulcanized in said rubber ring, each said arm having first connecting means for connecting said ring to the drive shaft for transmission of torque therebetween, said first connecting means comprising a bore for receiving a fastening member for connecting a respective one of said arms to the drive shaft;

fastening elements disposed between said arms and vulcanized into said rubber ring, each said fastening element having second connecting means for connecting said ring to the driven shaft for transmission of torque therebetween; and

centering means, comprising a projection extending axially from said hub spider provided in the region of the inner circumference of said hub spider for engaging a corresponding recess in the drive shaft, for centering said shaft comprising substantially without radial play relative to the drive shaft.

4,696,658

SHAFT COUPLER FOR COUPLING A ROTARY SHAFT OF AN IGNITION DISTRIBUTOR TO AN ENGINE CAMSHAFT

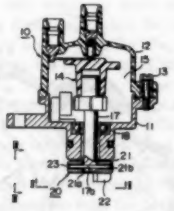
Eiichi Senda, Obu, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 28, 1985, Ser. No. 792,008

Claims priority, application Japan, Oct. 31, 1984, 59-230788

Int. Cl.[4] F16D *3/16*

U.S. Cl. 464—112 9 Claims



1. A coupler for coupling a rotary shaft of an ignition distributor to an engine camshaft in an internal combustion engone, said coupler comprising:

an annular member provided at a centre portion thereof with a circular axial recess, a diameter of which is larger than a diameter of the rotary shaft of the ignition distributor, whereby the rotary shaft loosely projects into said recess at one axial end of said annular member;

at least one projection provided on the other axial end of said annular member, said projection being slidably movable along and inclinable within a diametrical groove formed on a top end of said engine camshaft;

a straight bore diametrically extending through said annular member, an axis of said straight bore crossing a line passing through said projection in a centre of said annular member at a cross angle θ which is more than about 10° and less than about 85°; and

connecting pin means extending through said straight bore and a diametrical bore fixed at a distal end portion of the rotary shaft of the ignition distributor.

4,696,659

SWIVEL-JOINTED ROBOT ARM

Ole Molaug, Jernbanegaten 4, N-4340, Byrne, Norway

Continuation of Ser. No. 532,449, Sep. 15, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 812,785

Claims priority, application Norway, Sep. 28, 1982, 823260

Int. Cl.[4] F16C *1/04;* B25J *17/00*

U.S. Cl. 464—148 1 Claim

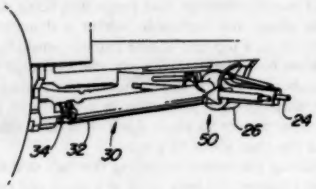
1. A swivel-jointed robot arm adapted to be driven in controlled flexing and rotational movements by a robot drive means including a rotatable shaft projecting forwardly along a robot drive axis, comprising a plurality of interconnected rigid links wherein successive links are linked together in the fashion of chain links and are mutually pivotally connected by universal joints disposed between the interlinking ends of the links, wherein two adjacent links are joined to the same intermediate link and have respective link ends in abutting relationship, and wherein the rearwardmost link end is joined to the forwardly projecting rotatable shaft, and wherein the forwardmost link end is joined to a tool-coupling shaft, the respective links further comprising the intermediate link having a rearwardly facing link end having an opening with a spherical bearing affixed therein and a ball rotatable in said bearing, said ball having a hole therethrough sized to slidably accept said drive means forwardly projecting rotatable shaft to permit unrestrained movement of said link end along said robot drive axis and also having a forwardly facing link end having an opening with a spherical bearing affixed therein and a ball rotatable in said bearing, said ball having a hole therethrough; the rewardmost of the two adjacent links having a forwardly facing link end having an opening with a spherical bearing affixed therein and a ball rotatable in said bearing, said ball having a hole therethrough; the forwardmost of the two adjacent links having a rearward facing link end having a pin affixed thereto, said pin slidably engaging the hole in the ball in the forwardly facing link end of said rewardmost adjacent link; and a further front link joined to the too-coupling shaft, said further front link having a rearward facing link end having a pin affixed thereto, said pin slidably engaging the hole in the ball in the forwardly facing link end of said intermediate link.

4,696,660

TRACTOR DRIVE SHAFT SHIELD ASSEMBLY

Kenneth E. Murphy, Dike; Ronald A. Martin, Cedar Falls, and Gary M. Nies, Waterloo, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Aug. 20, 1984, Ser. No. 642,026
Int. Cl.[4] F16C *1/26*
U.S. Cl. 464—170 **2 Claims**



1. In a vehicle having a transmission enclosed by a first housing, an axle enclosed by a second housing and a drive shaft connected to the transmission and to the axle via U-joints, a shield assembly comprising:

a cylindrical quill fixed to the first housing;

a support ring fixed to the second housing;

a one-piece, non-telescoping cylindrical shield coaxially surrounding the drive shaft and at least one of the U-joints, the shield having a first end slidably and rotatably engaging and supported by a portion of the quill and a second end slidably and rotatably engaging and supported by the ring, at least one end of the shield having an opening through which lubrication of the at least one U-joint may be achieved, the shield being rotatable from a first position wherein the opening faces upwardly to a second position wherein the opening faces downwardly;

means for releasably holding the shield in its first position while the drive shaft is rotating during normal operation of the vehicle; and

means fixed to the support ring for preventing debris from entering the shield at its second end, comprising a pair of arcuate-shaped members, each member having a flange extending therefrom for attachment to a part of the support ring so that the arcuate members extend across an annular space between the shield and the drive shaft.

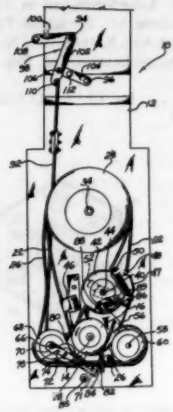
4,696,661

FORWARD-REVERSE BELT TRANSMISSION

Weber Rehlander, 4922 N. Fail Rd., Laporte, Ind. 46350

Filed Dec. 22, 1986, Ser. No. 944,370
Int. Cl.[4] F16H *11/04*
U.S. Cl. 474—5 **10 Claims**

1. In a power transmission including a rotatable drive member, first and second rotatable driven members, first belt means connected between said drive member and first and second driven members for effecting rotation of the first driven member in a first direction, third and fourth rotatable driven members positioned adjacent said drive member, and second belt means connected between said drive member and said first, third and fourth driven members for effecting rotation of said first driven member in a second direction opposite that of said first direction, the improvement comprising a clutch member carried by one of said third and fourth driven members for pivotal movement relative to said drive member, said third and fourth driven members positioned on opposite sides of said drive member and pivotally movable relative to the drive member, and means for shifting said second, third and fourth driven members between a neutral position wherein no tension is placed on either of said belt means and said first driven member is stationary, a forward position wherein said second driven member exerts tension on said first belt means to effect rotation of said first driven member in its said first direction, and a reverse position wherein said third and fourth driven members exert tension on said second belt means to effect rotation of said first driven means in its said second direction, said clutch member constituting means for momentarily engaging said first belt means as said third and fourth driven members are shifted from their said neutral position into their said forward position wherein a smooth transmission from neutral into forward is achieved.

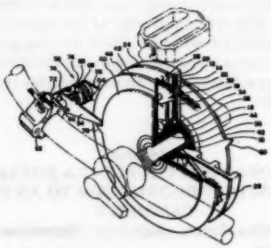


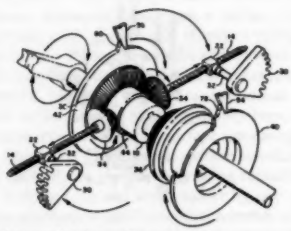
4,696,662

VARIABLE-SPEED DRIVE UNIT

Henry E. Gummeringer, 307 E. 121st St., Tacoma, Wash. 98445

Filed Aug. 4, 1986, Ser. No. 892,905
Int. Cl.[4] F16H *55/52*
U.S. Cl. 474—49 **7 Claims**





1. A variable-speed drive unit comprising:

a hub adapted for driving connection to a shaft;

a drive wheel;

a series of radially extending threaded rods rotatably mounted between said hub and said drive wheel;

a primary bevel gear rigidly mounted to the radially inner end of each of said threaded rods;

a pair of secondary bevel gears, each of said secondary bevel gears being rotatably mounted around said hub, and in driving engagement with said primary bevel gear;

an actuator disk rigidly attached to each of said secondary bevel gears;

an internally threaded boss means threadedly attached to each of said threaded rods and slidably mounted to said drive wheel;

a pair of chain sprocket segments, each of said segments rigidly attached to said boss means on radially opposite threaded rods;

a chain sprocket rotatably atttached to each of said threaded bosses which are not attached to said sprocket segments; and

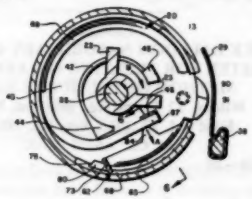
an actuator cam means adapted for selective engagement with one or the other of said actuator disks whereby rotation of said hub and drive wheel during said engagement will cause rotation of said threaded shafts resulting in selective radially inward or outward movement of said chain sprocket segments and chain sprockets.

4,696,663

BELT TENSIONER

Henry W. Thomey, Windsor, and John B. Heuninck, Tecumseh, both of Canada, assignors to Dyneer Corporation, Scottsdale, Ariz.

Filed Apr. 14, 1986, Ser. No. 851,460
Int. Cl.[4] F16H 7/08
U.S. Cl. 474—133 **25 Claims**



1. A belt tensioner construction for automatically tensioning an endless belt of a drive system for vehicle accessories, said tensioner construction including:

(a) a housing adapted to be mounted on a vehicle adjacent the drive belt;

(b) lever means pivotally mounted with respect to the housing for movement toward and away from the drive belt;

(c) pulley means rotatably mounted on the lever means and engageable with the drive belt for applying a tensioning force on said belt when the lever means is biased in a belt-tensioning direction toward the drive belt;

(d) spring means acting between the housing and lever means for biasing the lever means in the belt tensioning direction;

(e) brake means mounted on the lever means for frictional engagement with the housing for retarding pivotal movement of the lever means with respect to the housing; and

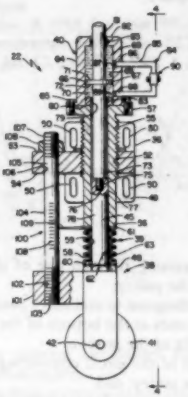
(f) fulcrum means formed on the lever means and engaged by the spring means for directing a first end of the spring means into engagement with the brake means biasing the brake means into frictional engagement with the housing as the spring means biases the lever means in the belt tensioner direction.

4,696,664

BELT TENSIONING MEANS

Leslie B. Wilson, Reeds Spring, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Filed Aug. 27, 1981, Ser. No. 296,694
Int. Cl.[4] F16H 7/12
U.S. Cl. 474—138 **5 Claims**



1. In a method of tensioning a power transmission belt that operates in an endless path by utilizing a tensioner for said belt, said tensioner comprising a support means fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, and mechanical spring means operatively associated with said support means and said belt engaging means urging said belt engaging means relative to said support means in a belt tensioning direction and against said belt with a force to tension said belt, the improvement comprising the step of arranging said spring means to increase its urging force on said belt engaging means as said belt engaging means moves in said belt tensioning direction relative to said support means throughout the entire normal tensioning range of movement of said belt engaging means relative to said support means.

4,696,665

PULLEY FOR A SYNCHRONOUS DRIVE SYSTEM COMPRISING A POLYMERIC MATERIAL TOOTHED-BELT AND RELATED TRANSMISSION

Vincenzo Macchiarulo, Chieti, and Ezio Marcelli, Pescara, both of Italy, assignors to Pirelli Transmissioni Industriali S.p.A., Milan, Italy

Filed Jun. 7, 1985, Ser. No. 742,237
Claims priority, application Italy, Jun. 11, 1984, 21346 A/84
Int. Cl.[4] F16H 7/02
U.S. Cl. 474—153 **12 Claims**

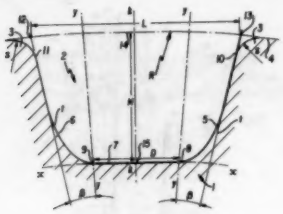
1. A pulley suitable for the transmission of motion with a flexible toothed belt of polymeric material comprising a plurality of grooves alternating with teeth, each groove comprising two flanks and each flank having a parabolic arc-shaped profile, said groove having a bottom whose ends coincide with the vertices of the parabolic arc-shaped profiles, the length of said bottom being at least approximately 65% of the length of each parabolic arc-shaped profile of the flanks of said groove, the length of each parabolic arc-shaped profile being measured between said vertices and a point of a circle having a predetermined radius r connecting the flank with the tooth of the pulley, each of said arc-shaped profiles being defined by the curve:

$$y = Kx^2$$

where:

$$K = \frac{\tan^2(90 - \beta)}{4Yo}$$

$Yo = H - r(1 - \sin \beta)$ and is the ordinate position of a tangent point between said parabolic arc-shaped profile and said circle of radius r;



y is an axis passing through one of the two ends of said bottom of the pulley;

x is an axis orthogonal to said axis y passing through said one of the two ends at the bottom of the pulley;

H is the height of the groove;

r is the radius of the circle connecting each flank with the teeth of the pulley; and

β is the angle formed by a tangent line common to said parabolic arc-shaped profile and to said circle of radius r, with the axis y.

4,696,666

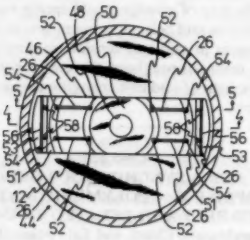
CENTRIFUGE MACHINE AND ROTOR

Richard D. Rice, Jr., 3030 S. Xeric Ct., Denver, Colo. 80231

Filed Jul. 18, 1986, Ser. No. 886,913

Int. Cl.[4] B04B *5/02*

U.S. Cl. 494—16 **18 Claims**



1. A centrifuge rotor for use in blood analysis for separating red blood cells from blood plasma used with a tube having an inside and an outside with at least one end of the tube sealed with sealing means, the tube containing blood which is subjected to rotary action, comprising:

(a) a base;

(b) at least two first tube retainer means fixedly attached to the base;

(c) at least two second tube retainer means fixedly attached to the base;

(d) an elongated hole in at least two of the tube retainer means for securely positioning the tube in place; and

(e) whereby the centrifuge rotor is rotated and the red blood cells are separated from the blood plasma, the first and second retainer means serving to securely hold the tube containing the blood in place during centrifuging thereby eliminating the use of a separate cover to retain the tube in place.

4,696,667

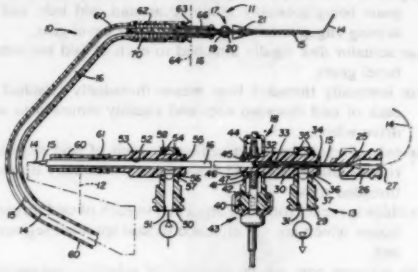
INTRAVASCULAR CATHETER AND METHOD

Helmut Masch, 764 Asbury St., San Jose, Calif. 95126

Filed Mar. 20, 1986, Ser. No. 841,879

Int. Cl.[4] A61B *17/20*

U.S. Cl. 604—22 **23 Claims**



1. An intravascular catheter for clearing a blockage in a blood vessel or the like comprising

flexible guide means for locating said vessel,

a flexible first tube having said guide means mounted for relative rotational and reciprocal movement therein,

a rotary flexible second tube having said first tube mounted for relative reciprocal movement therein,

means for selectively rotating said second tube, and

cutting means for cutting said blockage into fragments in response to rotation of said second tube comprising an outer cutting head mounted on said first tube, an inner cutting head rotatably mounted in protected relationship within said outer cutting head and connected to said second tube for simultaneous rotation therewith and cooperating blade means between said outer and inner cutting heads for cutting said blockage.

4,696,668

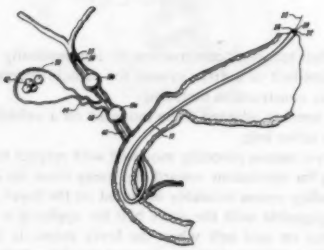
DOUBLE BALLOON NASOBILIARY OCCLUSION CATHETER FOR TREATING GALLSTONES AND METHOD OF USING THE SAME

Gilbert M. Wilcox, 12 Towne Rd., Boxford, Mass. 01921

Filed Jul. 17, 1985, Ser. No. 756,065

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—28 **4 Claims**



1. A method of dissolving gallstones lodged in the gallbladder of a human body with a dissolution agent, comprising the steps of:

inserting a double balloon nasobiliary occlusion catheter into a human body in which gallstones have lodged in the gallbladder, said catheter having passages running therethrough for venting bile, for inflating and deflating balloons, and for infusing a dissolution agent and aspirating bile, cholesterol or other pigment laden dissolving solutions, said catheter being inserted so that the catheter extends into the common bile duct and common hepatic

duct with a balloon positioned in the bile duct on each side of the entrance to the cystic duct;

inflating said balloons by forcing a fluid through said inflating and deflating passage, said balloons being inflated through a diameter greater than the diameter of the bile duct so as to isolate the portion of the bile duct between said balloons;

injecting a dissolution agent through said infusing and aspirating passage of said catheter into said isolated portion of the bile duct and into the cystic duct and gallbladder;

aspirating said dissolution agent and dissolved gallstones from said gallbladder and cystic duct through said infusing and aspirating passage of said catheter;

while said balloons are inflated, venting bile from the common hepatic duct through a distal end of said catheter through said bile venting passage of said catheter to the proximal end of said catheter;

once said gallstones are dissolved, deflating said balloons by allowing the inflating fluid to be discharged through said inflating and deflating passage, and

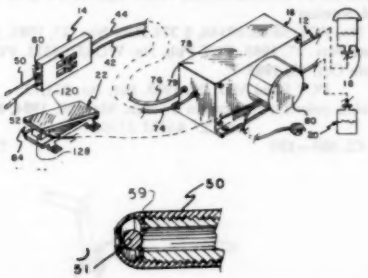
withdrawing the catheter from the body.

4,696,669

HAND HELD COMBINATION FLUSH WITH ADJUSTABLE NOZZLE AND/OR SUCTION APPARATUS

Monty J. Menhusen, 2441 Winstead Cir., Wichita, Kans. 67226

Filed Mar. 24, 1986, Ser. No. 843,114
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—34 **1 Claim**



1. A combination flush and/or suction apparatus operable to supply and/or remove fluid from an area being operated on, comprising:

(a) a control and dispenser apparatus which can be held in one hand of a person;

(b) a pump assembly connected to said control and dispenser apparatus to provide independently a fluid supply and a fluid suction thereto;

(c) said control and dispenser apparatus including a main support body having an inlet assembly and an outlet assembly connected thereto and having a spray nozzle assembly and a vacuum nozzle assembly projecting outwardly therefrom connected to said outlet assembly;

(d) a control assembly operably connected to the said outlet assembly to control fluid flow outwardly through said outlet spray nozzle assembly and independently control suction through said vacuum nozzle assembly; and

(e) said pump assembly having first and second tube members therein and a pump roller assembly engagable with said first and second tube members; and

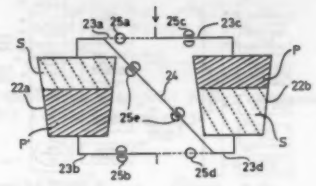
(f) said pump roller assembly operable on rotation thereof to engage said first and second tube members to provide concurrently a fluid flow function in one of said tube members and a fluid suction function in the other tube members caused by rotation of said pump roller assembly; and said spray nozzle assembly having a chamber at its distal end thereof wherein a circular axially moveable seal means resides, said chamber being threadedly adjustable to regulate and control the flow through said distal end of the nozzle assembly.

4,696,670

METHOD AND APPARATUS FOR TREATING BLOOD CONSTITUENTS

Michikazu Ohnishi, Kobe, and Nobutaka Tani, Minoo, both of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 6, 1985, Ser. No. 795,663
Claims priority, application Japan, Nov. 13, 1984, 59-240199
Int. Cl.[4] A61M *31/00*
U.S. Cl. 604—49 **2 Claims**



1. A method for treating circulatory fluid constituents, wherein in the specified order:

(a) a selective switching means switches the upstream side of a first circulatory fluid treatment device to receive from a source a flow of circulatory fluid, and switches the downstream side of said first circulatory fluid treatment device to send to a destination said flow of circulatory fluid; and then:

(b) said selective switching means, while maintaining said switching of said flow of circulatory fluid to the destination from the downstream side of said first circulatory fluid treatment device, switches the upstream side of said first circulatory fluid treatment device to interrupt communication with said flow of circulatory fluid from said source, further switches the upstream side of said second circulatory fluid treatment device to receive said flow of circulatory fluid from said source, and further switches the downstream side of said second circulatory fluid treatment device to communicate said flow of circulatory fluid to the upstream side of said first circulatory fluid treatment device; and then:

(c) said selective switching means, while maintaining said switching of said flow of circulatory fluid from said source into the upstream side of said second circulatory fluid treatment device, switches the downstream side of said first circulatory fluid treatment device to intercept sending flow of circulatory fluid to said destination, and further switches the downstream side of said second circulatory fluid treatment device to send to said destination said flow of circulatory fluid.

4,696,671

INFUSION SYSTEM HAVING PLURAL FLUID INPUT PORTS AND AT LEAST ONE PATIENT OUTPUT PORT

Paul Epstein, Brookline; Harry Petschek, Lexington, both of Mass.; Eric LaWhite, South Royalton, Vt.; Clair Strohl, Norfolk; Henry Coyne, Framingham, both of Mass.; Edward Kaleskas, Jefferson, and George Adaniya, Swampscott, both of Mass., assignors to Omni-Flow, Inc., Woburn, Mass.

Continuation of Ser. No. 578,180, Feb. 8, 1984, abandoned. This application Jun. 11, 1986, Ser. No. 873,478
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—67 **51 Claims**

1. An infusion system, comprising:

a housing having disposable cassette receiving means;

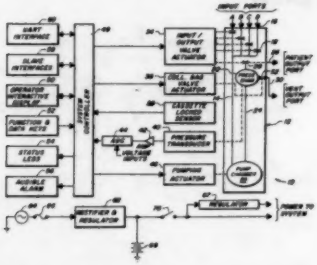
a disposable cassette releasably mounted to said cassette receiving means of said housing;

said disposable cassette including means for receiving individual ones of plural infusion flow lines;

means for pumping to at least one output line;

means cooperative with said line receiving means for selecting among plural sources of fluid respectively in fluid communication with said plural infusion flow lines that are to be individually pumped in any order by said pumping means;

said disposable cassette including means coupled to all of



said plural sources of fluid and cooperative with said selecting means for guiding each individual fluid selected from among the plural sources of fluid to the pumping means along a fluid path common to the plural sources and for guiding each such fluid from the pumping means to the at least one output line;

a clock for providing a timing signal;

means connected to the pumping means and to the clock for controlling the pumping means in accordance with the said instructions and said timing signal; and

means for establishing said set of instructions for each of said plural sources to include rate of pumping.

4,696,672

BLADDER CONTROL DEVICE

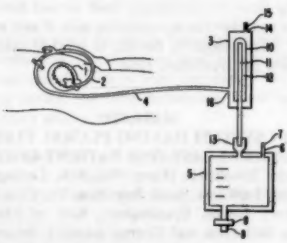
Masatsugu Mochizuki, Shiga; Masanobu Jige, and Yoshihiro Umemura, both of Kyoto all of Japan, assignors to Unitaka Ltd., Hyogo, Japan

Continuation of Ser. No. 704,001, Feb. 21, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 912,173

Claims priority, application Japan, Feb. 23, 1984, 59-33981; Apr. 6, 1984, 59-70525

Int. Cl.[4] A61M *5/325*

U.S. Cl. 604—128 **5 Claims**



1. A bladder assist device comprising:

a urethral catheter adapted to be embedded in a bladder of a patient;

a pressure control chamber having an upper end, a lower end and a concentric-type siphon tube therein between said upper end and said lower end, said siphon tube including an inner tube having an open end at an upper portion thereof and an outer tube around said inner tube, said outer tube having a closed upper end located above said inner tube and said outer tube having an open end at a lower end thereof spaced above said lower end of said pressure control chamber, said pressure control chamber having connection means connecting said pressure control chamber to said urethral catheter, said connection means connected to an opening in said pressure control chamber at a position between said open end of said upper portion of said inner tube and said open end of said lower end of said outer tube, said connection means also being vertically below a point at which said urethral catheter is embedded in the bladder of a patient and said open end of said upper portion of said inner tube being located at a position vertically above a point at which said urethral catheter is embedded in the bladder of a patient, said inner tube having the other end thereof located outside of said pressure control chamber;

a chamber connected to said other end of said inner tube for collecting urine passed through said concentric-type siphon tube; and

an air flow regulating filter disposed in an opening located in said pressure control chamber at a position above said upper portion of said inner tube.

4,696,673

COLON IRRIGATOR FOR USE WITHIN A TOILET BASIN

Birgitta B. M. Ledin-Bonevik, Intervägen 9, S-542 00 Mariestad, Sweden

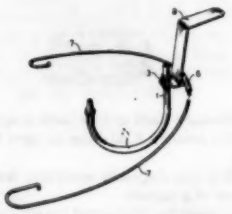
PCT No. PCT/SE85/00146, § 371 Date Nov. 27, 1985, § 102(e) Date Nov. 27, 1985, PCT Pub. No. WO85/04331, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 29, 1985, Ser. No. 821,735

Claims priority, application Sweden, Mar. 30, 1984, 8401786

Int. Cl.[4] A61M *37/00*

U.S. Cl. 604—150 **7 Claims**



1. A colon irrigation apparatus, comprising: a toilet basis (5) having a flushing outlet lip extending around an upper, inner periphery of a cavity of the basin, a colon irrigation device adapted to be readily attached to and removed from within said toilet basin and including a rigid rube (2) mounted to a rigid holder (1), one end of said tube being adapted for connection to a water container located at a higher level than the toilet basin (5) or to another water supply, and another, opposite end of said tube being connected to a rectum catheter (11) via a check valve (CV), the holder being disposed within the cavity of the toilet basin at the rear thereof with the rectum catheter extending substantially vertically upwardly in and above a central portion of the basin, and a pair of spring attachment arm means (7) extending laterally in mutually opposite directions from the holder in a common horizontal plane and arranged, when in use, to resiliently abut and engage mutually opposite inner wall portions of the toilet basin just under said flushing outlet lip thereof, with one arm on either side of the center line of the basin, said spring arm means being arcuate and generally conforming to the curvature of the inner wall of

the basin, and being self-biased outwardly away from the center of the basin to ensure a firm engagement therewith.

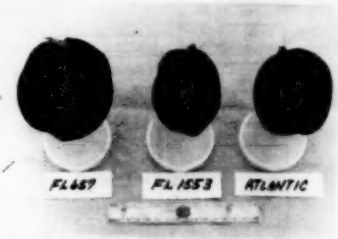
4,696,674

NOVEL POTATO CULTIVAR

Martin S. Cipar, Verona, Wis., assignor to Frito-Lay, Inc, Dallas, Tex.

Filed Feb. 10, 1986, Ser. No. 827,373
Int. Cl.[4] A01H 5/00
U.S. Cl. 800—1 5 Claims

1. A potato cultivar of the genus and species *Solanum tuberosum*, Group Tuberosum, having dark green, slow-growing but ultimately, vigorous vine growth and white flowers and resistance to a golden nematode race, having tubers characterized by a pale yellow flesh color, a relatively high specific gravity, a substantially smooth round to oval shape, and having the



protein electrophoretic fingerprint pattern substantially as shown in FIG. 1 of the drawings.

4,696,675

PROCESS FOR PREPARING WATER-INSOLUBLE BLUE AZO DYES ON THE FIBER: HYDROXYNAPHTHOIC AMIDE AND DIAZOTIZED DI-ALKOXY-BENZIDINE

Hasso Hertel, Mühlheim am Main; Klaus Hunger, Kelkheim, and Heinrich Frölich, Niedernhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

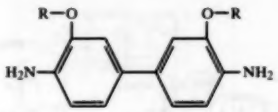
Filed Mar. 27, 1986, Ser. No. 845,623

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511543

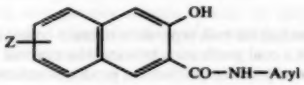
Int. Cl.[4] C09B *35/02*; D06P *1/12, 3/68*

U.S. Cl. 8—669 22 Claims

1. A process for preparing a water-insoluble disazo dye on a fiber, according to an azoic dyeing method, by bringing the fiber material, after its impregnation with a coupling component, into contact with the diazonium compound of an aromatic diamine in aqueous medium and coupling that bis-diazonium compound with the coupling component, which process comprises using as a bis-diazotizable diazo component a compound of the formula



in which R is a straight-chain or branched alkyl of 3 to 5 carbon atoms or a (C_1–C_3)-alkoxy-(C_2–C_4)-alkyl having straight-chain and/or branched alkyls of in total 3 to 5 carbon atoms, and as the coupling component a compound of the formula



in which Z is hydrogen, halogen or alkoxy of 1 to 4 carbon atoms, and aryl is phenyl or 1-naphthyl, or phenyl or 1-naphthyl substituted by 1, 2 or 3 substituents selected from the group consisting of halogen, nitro, alkyl of 1 to 4 carbon atoms and alkoxy of 1 to 4 carbon atoms, and carrying out the coupling reaction and dye formation on the fiber at a pH of between 4 and 10.

4,696,676

USE OF 1-NONEN-3-OL FOR REPELLING INSECTS

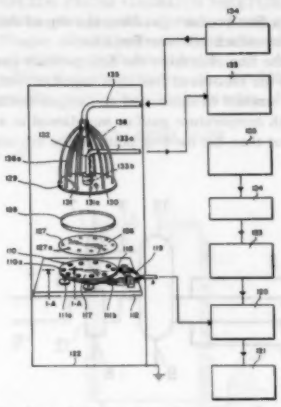
Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft; Braja D. Mookherjee, Holmdel, both of N.J.; Ira Katz, West Long Branch, and Kenneth R. Schrankel, Tinton Falls, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Division of Ser. No. 879,426, Jun. 27, 1986. This application Jan. 9, 1987, Ser. No. 2,020

Int. Cl.[4] C10L *5/00*

U.S. Cl. 44—7.5 3 Claims

1. A candle comprising a molded hydrocarbon wax composition having a protruding wick embedded therein said molded hydrocarbon wax composition consisting essentially of:



(a) crystalline paraffin wax; and

(b) an insect repelling quantity of 1-nonen-3-ol.

4,696,677

QUATERNARY AMMONIUM SALTS OF ANIONIC GUMS

George T. Colegrove, and Kenneth Clare, both of San Diego, Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 11, 1986, Ser. No. 850,467

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 7 Claims

1. A partially derivatized quaternary ammonium salt of an anionic gum comprising 3–20% quaternary ammonium compound by weight anionic gum, wherein said quaternary ammonium compound contains a single alkyl or alkenyl substituent of 13–24 carbon atoms or two alkyl or alkenyl substituents of 12–24 carbon atoms per substituent, and the ethylene oxide substituted analogs thereof.

7. An aqueous coal slurry comprising by weight 50–78% coal, 0–20% petroleum fuel, 0.01 to 0.1% partially derivatized quaternary ammonium salt of claim 1, 0–2% dispersant, and water to 100%.

4,696,678

METHOD AND EQUIPMENT FOR GASIFICATION OF COAL

Shuntaro Koyama; Hiroshi Miyadera, both of Hitachi, and Tomohiko Miyamoto, Takahagi, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Continuation of Ser. No. 353,902, Mar. 2, 1981, abandoned. This application Oct. 22, 1984, Ser. No. 663,813

Claims priority, application Japan, Mar. 6, 1981, 56-31120

Int. Cl.[4] C10J *3/54*

U.S. Cl. 48—201 2 Claims

1. A method for gasification of coal in a fluidized bed gasifier to improve gasification efficiency comprising the steps of:

introducing coal having a predetermined particle size distribution into an upper thermal cracking zone of a fluidized bed gasifier and introducing gasifying agents containing steam and an oxygen containing gas to the bottom of said fluidized bed gasifier;

thermally cracking the coal in the upper zone of the fluidized bed gasifier;

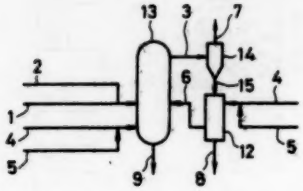
partially combusting the char, which is produced by the thermal cracking in said upper zone, and has moved down to the lower zone of the fluidized bed gasifier, in said

lower zone of the fluidized bed gasifier and recovering the ash produced thereby from the bottom of the fluidized bed gasifier;

recovering a first product gas from the top of the fluidized bed gasifier which contains fine char;

separating the fine char from the first product gas;

introducing the recovered fine char together with a predetermined amount of steam and an oxygen-containing gas into a high temperature gasifier maintained at a temperature higher than the melting point of the ash constituents



of the fine char to produce, by partial combustion of the fine char, a high temperature second product gas containing H_2 and CO as its main components and recovering the fine ash as the molten slag from the bottom of the high temperature gasifier; and

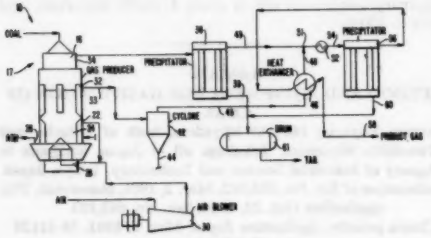
feeding the high temperature second product gas containing H_2 and CO directly to the coal feeding portion of the fluidized bed gasifier in the thermal cracking zone to promote the thermal cracking of the coal supplied to the upper zone of the fluidized bed gasifier.

4,696,679

METHOD FOR CLEANING GAS PRODUCED FROM SOLID CARBONACEOUS MATERIAL IN A TWO-STAGE GAS PRODUCER

Marilena Albulescu, Essex Fells, and Joseph F. McMahon, Clinton, both of N.J., assignors to Foster Wheeler USA Corporation, Livingston, N.J.

Filed Oct. 23, 1985, Ser. No. 790,675
Int. Cl.[4] C10K *1/04*
U.S. Cl. 48—203 **21 Claims**



1. A method for cleaning gas produced from solid carbonaceous material in a two stage gas producer consisting essentially of the steps of:

(a) passing second stage gas from the two stage gas producer through a first precipitator means to remove oil mist and particulates from the second stage gas;

(b) passing first stage gas from the two stage gas producer through a cyclone means to remove particulates from the first stage gas;

(c) cooling the first stage gas from the cyclone means;

(d) mixing the cooled first stage gas and the second stage gas from the first precipitator means, while maintaining the temperature of the gas mixture at least at the temperature of the second stage gas;

(e) cooling the gas mixture to a temperature in the range of about 25° F. to about 125° F. above the water dew point of the gas mixture; and

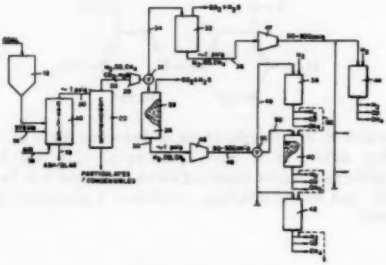
(f) passing the cooled gas mixture through a second precipitator means to remove oil mist and particulates from the gas mixture and yield an industrial usable gas.

4,696,680

METHOD AND APPARATUS FOR THE SELECTIVE SEPARATION OF GASEOUS COAL GASIFICATION PRODUCTS BY PRESSURE SWING ADSORPTION

Madhav R. Ghate, Morgantown, W. Va., and Ralph T. Yang, Williamsville, N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 3, 1985, Ser. No. 783,606
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—25 **13 Claims**



1. The method for bulk separation of multi-component gases generated in a coal gasification process wherein coal is gasified in a gasifier to produce gasification products including a mixture of gases comprising hydrogen, carbon monoxide, methane, and acid gas components carbon dioxide and hydrogen sulfide, comprising the steps of conveying a stream comprising the mixture of gases into one end of an elongated column containing a solid adsorbent for each of said gases forming the mixture of gases, pressurizing the charge of gases within said column to a pressure within a range sufficient to effect the adsorption by the adsorbent of the conveyed gases including said hydrogen defining the least absorbable gas in said mixture of gases, decreasing the partial pressure of the charge of gases in said column to effect the sequential desorption of the gases hydrogen, carbon monoxide, and methane from the adsorbent in said column, and conveying the adsorbed gases from said column upon desorption thereof from said adsorbent.

4,696,681

PSA ASSEMBLY

Andrew LLoyd-Williams, High Bridge, N.J., assignor to The BOC Group, Inc., Montvale, N.J.

Filed Oct. 1, 1986, Ser. No. 914,099
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—28 **13 Claims**

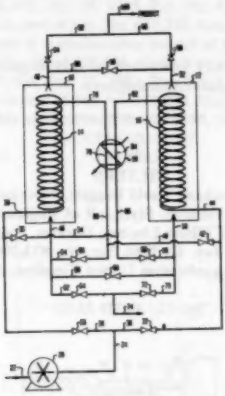
1. In a process for selective enrichment of a component of a compressed gaseous mixture wherein at least two beds of adsorption material are cycled through an adsorption step and a desorption step, the improvement comprising passing said compressed gaseous mixture in indirect heat transfer relationship to a bed of said adsorption material during desorption of said bed of said adsorption material and passing said gaseous mixture in indirect heat transfer relationship through a bed of adsorption material during selective enrichment of said component prior to the introduction of said gaseous mixture into said bed of adsorption material for selective enrichment.

7. A process for selective enrichment of a component of a gaseous mixture, which comprises the steps of:

(a) compressing said gaseous mixture;

(b) passing said gaseous mixture in indirect heat transfer relationship to a first bed of adsorption material to enhance desorption of an adsorbed component of said gaseous mixture;

(c) cooling said gaseous mixture of step (b);



(d) passing said gaseous mixture of step (c) in indirect heat transfer relationship through a second bed of adsorption material;

(e) cooling said gaseous mixture of step (d);

(f) passing said gaseous mixture of step (e) through said second bed of adsorption material to adsorb a component of said gaseous mixture; and

(g) recovering a gaseous product from step (f) enriched in said component.

4,696,682

SOLID ADSORBENT FOR CARBON MONOXIDE AND PROCESS FOR SEPARATION FROM GAS MIXTURE

Hidefumi Hirai; Makoto Komiyama; Susumu Hara, all of Tokyo, and Keiichiro Wada, Kiyose, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 411,000, Aug. 24, 1982, Pat. No. 4,470,829. This application Mar. 8, 1984, Ser. No. 587,674

Claims priority, application Japan, Aug. 31, 1981, 56-136526; Dec. 16, 1981, 56-203053; Jan. 22, 1982, 57-008303

Int. Cl.⁴ B01D *53/04*

U.S. Cl. 55—68 **6 Claims**

1. A process for separating carbon monoxide from a gas mixture containing the same, comprising the steps of:

(1) contacting the gas mixture containing carbon monoxide with a solid adsorbent comprising (a) at least one copper (I) halide and (b) at least one aluminum (III) halide supported on (c) activated carbon or graphite in which the molar ratio of the copper (I) halide to the aluminum (III) halide is 0.3 to 10 and the weight ratio of the activate carbon or graphite to the copper (I) halide is 0.25 to 25, said contacting conducted at a temperature of from 0° C. to 90° C., and

(2) desorbing the adsorbed carbon monoxide from the solid adsorbent and recovering the carbon monoxide.

4,696,683

METHOD AND EQUIPMENT FOR SEPARATION OF SOLIDS FROM GASEOUS MIXTURES

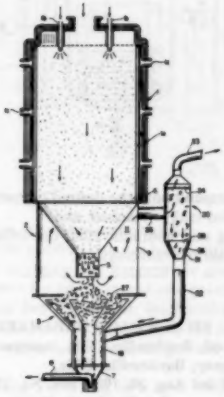
Jaroslav Vitovec, Prague; Jan Cermák, Karlstejn, and Jiri Smolik, Prague, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Czechoslovakia

Filed Feb. 27, 1986, Ser. No. 833,958

Claims priority, application Czechoslovakia, Jul. 16, 1985, 5276-85

Int. Cl.⁴ B01D *59/08*

U.S. Cl. 55—82 **6 Claims**



1. A method for separation of phthalic anhydride from a gaseous stream which originates from desublimation cooling of vapor of phthalic anhydride by water spraying in a desublimator, wherein the mixture upon exiting an outlet from the desublimator contains solid phthalic anhydride in the form of flakes and the velocity of its flow is 0.15 to 1 m/s, wherein the method comprises accelerating the flow of the gaseous stream after desublimation through a frusto-conical member to a velocity of 0.6 to 25 m/s to agglomerate said solid phthalic anhydride and subsequently decelerating said flow to a velocity of 0.15 to 1 m/s for gravitationally separating 95 to 99% of the phthalic anhydride in the form of agglomerated solids from the gaseous stream and recovering the gaseous stream.

4,696,684

METHOD AND APPARATUS FOR ELIMINATING CAVITATION IN HYDRAULIC SYSTEMS

Hanshi Shen, Room 403, 93, 11 Cun, Shanghai Petroleum and Chemical Factory, Jinshan, Shanghai, China

Filed Jun. 13, 1986, Ser. No. 873,810

Claims priority, application China, Jun. 13, 1985, 85104763

Int. Cl.⁴ B01D *19/00*

U.S. Cl. 55—89 **12 Claims**

1. A method for eliminating cavitation in hydraulic system, comprising the following operations:

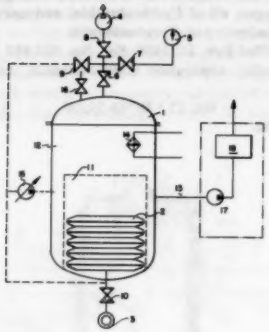
a. Filling a sealed tank with hydraulic fluid to full extent when a volume changeable device, which is connected to said sealed tank, is pressurized,

b. Vacuumizing the volume changeable device so that the level of hydraulic fluid in said sealed tank descends, making space in the top portion of said tank to make the air, water content and volatile substances to separate from said hydraulic fluid and escape to the top portion of said sealed tank without volatilization of said hydraulic fluid,

c. Vacuumizing said top portion of said sealed tank and volume changeable device simulaneously for exhausting said air, water content and volatile substances out of said tank, but not drawing out said hydraulic fluid, when the

vacuum pressure in said sealed tank is substantially kept balanced,

d. Gradually pressurizing said volume changeable device to



make it expand until the desired operating pressure inside said sealed tank is reached, and

e. Pumping said hydraulic fluid out of said sealed tank to supply said hydraulic system.

4,696,685

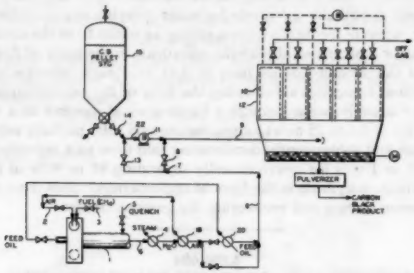
FILTER BAG PREPARATION

James Q. Wood, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 30, 1985, Ser. No. 772,980

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—97 **7 Claims**



1. A process for extending the life of bags used as filters in a carbon black process, comprising the steps of (1) preheating new bags with carbon black free hot gases until the bags reach operating temperature (2) flowing particle dry carbon black having a low aromatic content and a photelometer value of at least about 90 in a hot gas carrier into said bags for a length of time sufficient to provide the bags with a coating of dry carbon black and (3) thereafter filtering carbon black process effluent.

4,696,686

OXYGEN SEPARATING MEMBER AND PROCESS FOR PRODUCING THE SAME

Kyohei Usami, Inazawa, and Katsuhiko Watanabe, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 19, 1985, Ser. No. 810,569

Claims priority, application Japan, Dec. 27, 1984, 59-276715

Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—158 **19 Claims**

1. An oxygen separating member comprising:

a composite membrane consisting of a porous substrate and a single organopolysiloxane film formed on a surface of said substrate, a fluorine-containing organic compound

being chemically combined in said organopolysiloxane film in a non-plasma atmosphere.

4,696,687

FILTERS

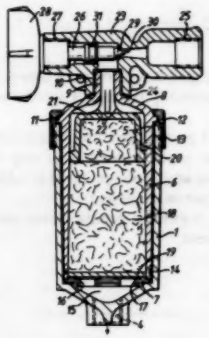
Colin T. Billiet, Durham; David Baggett, Newcastle upon Tyne, and Robert M. Fielding, Blyth, all of England, assignors to Domnick Hunter Filters Limited, Durham, England

Filed Jun. 12, 1986, Ser. No. 873,398

Claims priority, application United Kingdom, Jun. 13, 1985, 8515047

Int. Cl.[4] B01D *53/02*

U.S. Cl. 55—316 **9 Claims**



1. A filter pack for connection to a supply of compressed air in order to provide an unfiltered primary output supply of air from the pack and a filtered secondary output supply of air from the pack, the pack comprising a first housing member having an inlet port and a first outlet port, means for connecting said inlet port to a supply of compressed air, means for connecting said first outlet port to a primary output supply line; a second housing member removably fitted into said first housing member through an opening in said first housing member and having a section accessible through said opening; means for releasably securing the two housing members together; activated carbon filter material at least partially filling said second housing member and said second housing member having a wall portion thereof which is formed with an inlet into the interior thereof, said wall portion combining with part of said first housing member to form a chamber in communication with said inlet port and with said first outlet port; said accessible section of said second housing member comprising a second outlet port adapted to be connected to a secondary output supply air line, whereby the pack defines a first flow path directly from said inlet port through said chamber to said first outlet port for discharge of unfiltered air from the pack, and a second flow path from said inlet port through said chamber and through said filter material to said second outlet port for discharge of filtered air from the pack.

4,696,688

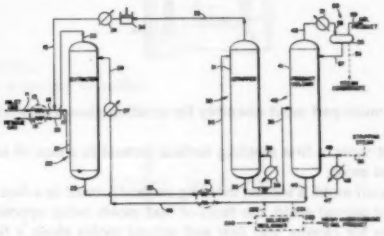
CONVERSION OF LEAN OIL ABSORPTION PROCESS TO EXTRACTION PROCESS FOR CONDITIONING NATURAL GAS

Yuv R. Mehra, Odessa, Tex., assignor to Advanced Extraction Technologies, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 808,463, Dec. 13, 1985, which is a continuation-in-part of Ser. No. 784,566, Oct. 4, 1985, Pat. No. 4,617,038, which is a continuation-in-part of Ser. No. 759,327, Jul. 26, 1985, Pat. No. 4,623,371, which is a continuation-in-part of Ser. No. 758,351, Jul. 24, 1985, Pat. No. 4,601,738, which is a continuation-in-part of Ser. No. 637,210, Aug. 3, 1984, Pat. No. 4,578,094, which is a continuation-in-part of Ser. No. 532,005, Sep. 14, 1983, Pat. No. 4,526,594, which is a continuation-in-part of Ser. No. 507,564, Jun. 24, 1983, Pat. No. 4,511,381, which is a continuation-in-part of Ser. No. 374,270, May 3, 1982, Pat. No. 4,421,535. This application Feb. 13, 1986, Ser. No. 828,996

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—17 47 Claims



1. In an absorption process for the removal of C_2+ hydrocarbons from a natural gas stream by absorbing said C_2+ hydrocarbons with a lean oil to produce a residue gas stream of pipeline quality and a rich oil from which the C_2+ hydrocarbons are recovered,

the improvement which comprises providing the capability, within existing equipment after reasonable retrofit thereof of selectively extracting said C_2+ hydrocarbons from said gas stream with a lean preferential physical solvent according to said maximum recoveries and to said selected degree of (a) ethane in amounts ranging up to 95%, (b) propane in amounts ranging up to 100%, (c) butane in amounts ranging up to 100%, or (d) pentanes and hihger molecular weight hydrocarbons in amounts ranging up to 100% by:

A. selecting an absorber plant, having said existing equipment, which is used for recovering maximum quantities of said C_2+ hydrocarbons from said gas stream while using lean oils as solvent for said C_2+ hydrocarbons;

B. selecting a preferential physical solvent which is selective for ethane and heavier hydrocarbon components of said gas stream such that the relative volatility of methane over ethane is at least 6.0 and the solubility of ethane in said solvent is at least 1.0 standard cubic foot of ethane per gallon of said solvent or the preferential factor is at least 6.0;

C. replacing said oils in said selected absorber plant with a selected volume of said selected preferential physical solvent; and

D. while using said equipment in extraction mode, contacting said gas stream with said lean preferential physical solvent at a selected flow rate within the range of 0.001–0.5 gallon of lean solvent per standard cubic foot of said gas stream to produce a residue gas stream of pipeline specifications and a rich solvent stream containing said ethane and heavier hydrocarbon components.

4,696,689

METHOD AND APPARATUS FOR SEPARATING OF PRODUCT GAS FROM RAW GAS

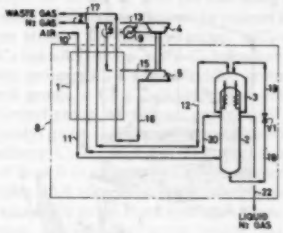
Hideharu Mori; Shozi Koyama, and Masahiro Yamazaki, all of Kudamatsu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 2, 1985, Ser. No. 803,675

Claims priority, application Japan, Nov. 30, 1984, 59-251822

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—32 28 Claims



1. A gas separating apparatus comprising:

a heat exchanger for cooling raw gas by effecting a thermal exchange with returning low temperature gas;

a fractionating tower for taking in said raw gas cooled down by means of said heat exchanger, fractionally separating said raw gas into at least one product gas and an offgas and outputting said at least one product gas and said offgas, respectively;

an expansion turbine for taking in a low temperature gas within a process and subjecting said low temperature gas to adiabatic expansion for generating a cryogenic effect;

a path for leading normal temperature gas to a booster actuated by said expansion turbine after said low temperature gas has been restored to a normal temperature to form said normal temperature gas by means of said heat exchanger, said booster being capable of pressurizing said normal temperature gas;

a cooling means for cooling said gas pressurized by said booster to a much lower temperature; and

a path for leading said gas cooled by said cooling means to said expansion turbine.

4,696,690

METHOD AND DEVICE FOR PREHEATING RAW MATERIALS FOR GLASS PRODUCTION, PARTICULARLY A CULLET MIXTURE

Helmut Roloff, Neinburg, Fed. Rep. of Germany, assignor to Himly, Holscher GmbH & Co., Nienburg, Fed. Rep. of Germany

Filed Feb. 7, 1986, Ser. No. 826,953

Int. Cl.[4] C03B *1/00*

U.S. Cl. 65—27 20 Claims

1. A method for preheating a cullet mixture used for glass production and stored in a bunker (19), comprising: first, passing exhaust gas from a glass melting furnace (10) through a heat exchanger (13) to preheat fresh combustion air for the glass melting furnace (10); and, then, via a plurality of flow ducts (33) connected in flow-communication with one another, flowing the exhaust gas from the heat exchanger through the cullet mixture (20) in the bunker (19) to cause the residual heat in the exhaust gas to preheat the cullet mixture (20); and, to raise the temperature in the bunker (19), mixing exhaust gas coming directly from the glass melting furnace (10) with the exhaust gas exiting the heat exchanger.

10. A device for preheating cullet (20) used for glass production and stored in a bunker (19), comprising:

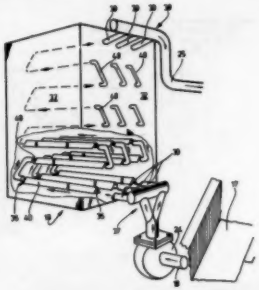
a plurality of flow ducts (33) arranged in the bunker (19); horizontal groups of adjacent paralle flow ducts (33) lying

alongside one another in several vertically-spaced duct levels (34);

the flow ducts (33) in adjacent duct levels (34) being offset with respect to each other;

the same number of flow ducts (33) being in each duct level (34); and

wherein an upper half of each duct (33) is formed as an equal-sided angle section (40) whose apex edge (42) is directed upward, and



front sides of the angle sections (40) being affixed to opposite side walls (32) of the bunker (19); and

an overflow duct (36, 48) interconnecting each duct (33) in a level (34) with a corresponding duct (33) in an adjacent level (44), each overflow duct (36, 48) being assigned to the front side of the corresponding flow duct (33) directed toward the same side wall (32) of the bunker (19).

4,696,691

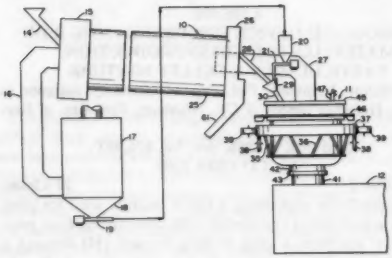
METHOD OF GLASS BATCH PREHEATING AND LIQUEFYING WITH RECYCLING OF PARTICULATES

Robert A. Lawhon, Chehalis, Wash.; Robert B. Heithoff, LaVale, Md., and Wayne H. Gonzalez, Tumwater, Wash., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 2, 1986, Ser. No. 914,226

Int. Cl.[4] C03B *3/00*

U.S. Cl. 65—27 **19 Claims**



1. In a method for processing batch materials wherein pulverulent material is preheated by contact with hot gas whereby particulate material becomes entrained in the gas, and preheated material is transferred to a liquefying zone where intensified heating rapidly renders the material to an at least partially melted liquefied condition, characterized by separating the entrained particulates from the gas and adding the particulates to the preheated material immediately prior to being liquefied so as to incorporate the particulates into the liquefied mass.

4,696,692

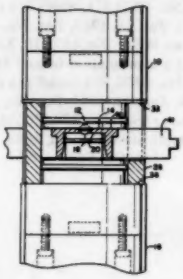
KINEMATICALLY DETERMINATE GLASS PRESSING MOLD ASSEMBLY AND METHOD OF USE

Paul S. Schmitt, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Dec. 10, 1986, Ser. No. 940,120

Int. Cl.[4] C03B *23/26*

U.S. Cl. 65—102 **17 Claims**



1. A multi-part mold assembly for molding glass lenses comprising:

a first mold, a first molding surface formed in a face of said first mold;

a second mold, a second molding surface formed in a face of said second mold, the faces of said molds being opposed;

means for closing said first and second molds along a first axis to form a mold cavity including said first and second molding surfaces;

sleeve means positioned between said first and second molds for kinematically determining the alignment of said first and second molding surfaces;

one of said sleeve means and said first mold having a first set of three alignment pads formed thereon, the other of said sleeve means and said first mold set having first surface means for abutting said alignment pads and for constraining said first mold against rotation about axes which are orthogonal to the direction of closing said molds; and

one of said sleeve means and said second mold having a second set of three alignment pads formed thereon, the other of said sleeve means and said second mold having second surface means for abutting said second set of alignment pads and for constraining said second mold against rotation about axes which are orthogonal to the direction of closing said molds.

15. A method of precision molding optical elements from heat-softened glass preforms which comprises:

providing a first mold having a first molding surface;

providing a second mold having a second molding surface;

providing a sleeve member between said first and second molds for cooperating therewith to kinematically align said first and second molding surfaces;

providing a sleeve insert for retaining a glass preform to be molded into a precision optical element;

heat-softening said preform; and

moving said first and second molds along a first axis toward one another to form a mold cavity including said first molding surface, said second molding surface and a cavity in said sleeve insert for precision molding an optical element from the heat-softened preform retained by said insert, while simultaneously kinematically aligning said first and second molding surfaces solely with respect to five degrees of freedom including displacements with respect to said first axis and second and third axes orthogonal to each other and said first axis and with respect to angular rotation about said second and third axes.

4,696,693

OXIDIZED SULFUR DERIVATIVES OF DIAMINOPHOSPHINYL COMPOUNDS AS UREASE INHIBITORS AND UREASE INHIBITED UREA BASED FERTILIZER COMPOSITIONS

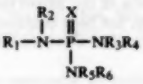
Michael O. Swerdloff, Parsippany; Milorad M. Rogic, Whippany, both of N.J., and Larry L. Hendrickson, Camillus, N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 563,347, Dec. 20, 1983, Pat. No. 4,629,491. This application May 12, 1986, Ser. No. 861,809

Int. Cl.[4] C05C *9/00*

U.S. Cl. 71—28 **8 Claims**

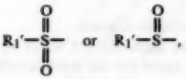
1. A method of inhibiting the urease catalyzed hyrolysis of urea at a situs which comprises applying to said situs a urease inhibiting effective amount of one or more compounds of the formula:



Wherein:

X is oxygen or sulfur;

R^1 is



wherein

R_1' is amino or substituted or unsubstituted alkyl, aryl or amino wherein permissible substituents are selected from the group consisting of one or more alkyl, aryl, halogen, trihalomethyl, nitro, cyano, alkanoyl, alkylcarboxylate, arylcarboxylate, alkoxy, hydroxy, alkylmercapto, arylmercapto, mercapto, amino, alkylamino, dialkylamino, arylamino, diarylamino, diaminophosphinyl, N-diaminophosphinyl, 0-diaminophosphinyl, S-diaminophosphinyl, carbamoyl and carbamoyldiaminophosphinyl;

R_2 is hydrogen, or substituted or unsubstituted alkyl or aryl where permissible substituents are selected from the group consisting of one or more alkyl, aryl, halogen, trihalomethyl, nitro, cyano, alkanoyl, alkylcarboxylate, arylcarboxylate, alkoxy, hydroxy, alkylmercapto, arylmercapto, mercapto, amino, alkylamino, dialkylamino, arylamino, diarylamino, diaminophosphinyl, N-diaminophosphinyl, 0-diaminophosphinyl, S-diaminophosphinyl, carbamoyl and carbamoyldiaminophosphinyl groups; and

R_3, R_4, R_5 and R_6 are the same or different and are hydrogen or alkyl having from about 1 to about 4 carbon atoms.

4,696,694

PYRIDINE DERIVATIVES AND THEIR HERBICIDAL COMPOSITIONS

Tatsuo Numata; Masataka Hatanaka, both of Funabashi; Junichi Watanabe, Narashino; Takasi Ikai, Tokyo; Tsutomu Nawamaki, Yono, and Kenji Hattori, Urawa, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

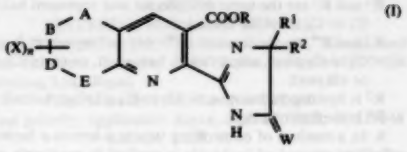
Filed Jul. 7, 1986, Ser. No. 882,408

Claims priority, application Japan, Jul. 25, 1985, 60-164407; Jan. 16, 1986, 61-6979; May 26, 1986, 61-120455

Int. Cl.[4] A01N *43/40*; C07D *49/052*

U.S. Cl. 71—86 **9 Claims**

1. A pyridine derivative having the formula:



(I)

wherein one of A, B, D and E is an oxygen atom, a sulfur atom, —SO—, —SO_2— or —NR^3—, with the rest being all carbon atoms, one double bond may or may not be present in the ring; X is a halogen atom, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a C_1–C_4 haloalkyl group, a C_1–C_4 haloalkoxy group, a C_1–C_4 alkylthio group, a C_1–C_4 haloalkylthio group, a C_1–C_4 alkoxycarbonyl group, a C_1–C_4 alkylthioalkyl group, a tetrahydrothiopyranyl group, a hydroxyl group, a CF_3 group or a phenyl or pyridyl group (which may be substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, CF_3, nitro or halogen); n is an integer of from 0 to 6, and when n is an integer of from 2 to 6, the plurality of X may be the same or different; W is an oxygen atom or a sulfur atom; R is a hydrogen atom, a di-lower alkylimino group, a C_1–C_5 alkyl group (which may be substituted by C_1–C_3 alkoxy, hydroxyl, C_3–C_6 halocycloalkyl carboxyl, lower alkoxycarbonyl, cyano, dialkylphosphonyl, halogen, benzyloxy, tri-lower alkylammonium or phenyl which may be substituted by halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy or nitro), a C_2–C_5 alkenyl group (which may be substituted by C_1–C_3 alkoxy, lower alkoxycarbonyl, two C_1–C_3 alkoxy or phenyl), a C_2–C_5 alkynyl group, a C_4 or C_5 oxacycloalkyl group, a C_2–C_5 mono-, di- or tri-haloalkenyl group, a C_2–C_5 haloalkynyl group, a glycidyl group, a furfuryl group, an alkylthioalkyl group, a C_3–C_6 cycloalkyl group which may be substituted by C_1–C_3 alkyl, or a cation selected from the group consisting of an alkali metal ion, an alkaline earth metal ion, an ammonium ion or a quaternary ammonium ion; R^1 is a C_1–C_4 alkyl group, R^2 is a C_1–C_4 alkyl group or a C_3–C_6 cycloalkyl group, or R^1 and R^2 together with the adjacent carbon atom, form a C_3–C_6 cycloalkyl group which may be substituted by C_1–C_3 alkyl; and R^3 is a hydrogen atom or a C_1–C_3 alkyl group; or an optical isomer of the derivative when R^1 and R^2 are different from each other.

9. A method for controlling weeds which comprises applying to the weeds or to the locus of the weeds an effective amount of a pyridine derivative or its optical isomer as defined in claim 1.

4,696,695

SULFAMOYL UREA DERIVATIVES

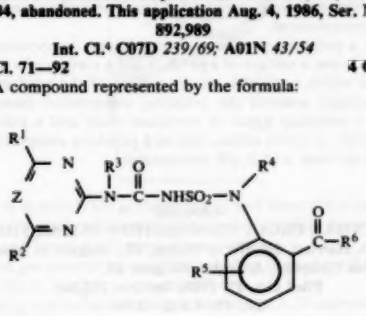
Barry V. Gemert, Massillon, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 791,269, Oct. 25, 1985, Pat. No. 4,622,065, which is a continuation-in-part of Ser. No. 667,513, Nov. 1, 1984, abandoned. This application Aug. 4, 1986, Ser. No. 892,989

Int. Cl.[4] C07D *239/69*; A01N *43/54*

U.S. Cl. 71—92 **4 Claims**

1. A compound represented by the formula:



wherein:

Z is CH;

R^1 and R^2 are the same or different and represent halogen or C_1 to C_6 alkyl, or alkoxy;

R^3 and R^4 are the same or different and represent hydrogen, C_1 to C_4 alkyl, alkoxyalkyl, haloalkyl, or up to C_3 alkenyl or alkynyl;

R^5 is hydrogen, halogen or C_1 to C_4 alkyl or haloalkyl; and

R^6 is methyl or ethyl.

4. In a method of controlling weeds wherein a herbicidally effective amount of herbicide is applied to a growth medium prior to emergence of weeds therefrom or to the weeds subsequent to their emergence from the growth medium, the improvement residing in using as the herbicide a compound or mixture of compounds defined in claim 1.

4,696,696

SINTERED ALLOY HAVING IMPROVED WEAR RESISTANCE PROPERTY

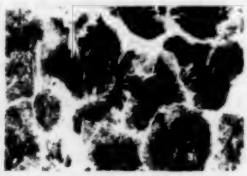
Yoshiaki Fujita, Saitama, and Satoshi Kawai, Tochigi, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1986, Ser. No. 870,373

Claims priority, application Japan, Jun. 17, 1985, 60-130006

Int. Cl.[4] C22C *29/02*

U.S. Cl. 75—246 **8 Claims**



1. A wear-resistant sintered alloy consisting essentially of: from 2.0% to 3.5% by weight of C, from 0.3% to 0.8% by weight of P, from 0.5% to 3.0% by weight of Mn, and remainder Fe, said alloy being sintered in liquid phase.

4,696,697

POLISHING COMPOSITION

Hirohito Kitano; Toshiki Oowaki, and Takashi Baba, all of Aichi, Japan, assignors to Fujimi Kenmazai Kogyo Kabushiki Kaisha, Japan

Filed Feb. 7, 1986, Ser. No. 827,195

Claims priority, application Japan, Jun. 4, 1985, 60-121200

Int. Cl.[4] C09G *1/04*

U.S. Cl. 106—3 **9 Claims**

1. A polishing composition comprising water, a polishing agent of aluminum oxide and a polishing accelerator of nickel sulfate, said polishing composition being neutral or weak acid in pH measurement.

5. In a polishing process with a polishing composition applied between a surface of a product and a surface of a polishing pad which is slidable on the surface of the product, the improvement wherein the polishing composition comprises water, a polishing agent of aluminum oxide and a polishing accelerator of nickel sulfate, and said polishing composition is neutral or weak acid in pH measurement.

4,696,698

FLEXIBLE GROUT COMPOSITION AND METHOD

Todd D. Harriett, Elk Grove Village, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Filed Oct. 15, 1985, Ser. No. 787,505

Int. Cl.[4] C04B *12/04*

U.S. Cl. 106—74 **22 Claims**

1. A grout composition for admixture with water to form a gelled grout essentially impermeable to water comprising, where percentages are percent by weight of the composition before admixture with water:

10–80% water-swellable clay;

20–80% solid, particulate filler;

0.5–35% water soluble silicate;

0.5 to 5% dispersing agent for the water-swellable clay; and

0.5–35% gelling agent for the water-swellable clay wherein the dispersing agent and gelling agent combination prevents the clay from gelling after admixture of the composition with water for at least one hour.

4,696,699

FLEXIBLE GROUT COMPOSITION AND METHOD

Todd D. Harriett, Elk Grove Village, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Continuation-in-part of Ser. No. 787,505, Oct. 15, 1985, abandoned. This application Apr. 7, 1986, Ser. No. 849,048

The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.

Int. Cl.[4] C04B *12/04*

U.S. Cl. 106—74 **23 Claims**

1. A grout composition for admixture with water to form a gelled grout essentially impermeable to water comprising, where percentages are percent by weight of the composition before admixture with water:

10–80% water-swellable clay;

20–80% solid, essentially non water-swellable particulate filler;

0.5–35% water soluble silicate;

0.5–5% dispersing agent for the water-swellable clay; and

0.5–35% gelling agent for the water-swellable clay wherein the dispersing agent and gelling agent combination prevents the clay from gelling after admixture of the composition with water for at least one hour.

4,696,700

INORGANIC PIGMENTS AND PROCESS FOR THEIR PRODUCTION

Robert Fischer, Obertshausen, and Dieter de Ahna, Egelsbach, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 12, 1983, Ser. No. 512,992

Int. Cl.[4] C04B *14/30*; C08K *3/22*; C09C *1/10*

U.S. Cl. 106—291 **22 Claims**

1. In an inorganic pigment having a spinel structure and having the formula AB_2O_4 where A is at least one of Co, Ni, Cu, Zn, Cd, Mg, Mn and Fe and B is at least one of Al, Cr, Fe, Ga, In, La and V, the improvement wherein a substantial portion of said pigment has the form of platelets, wherein the pigment has high covering power.

4,696,701

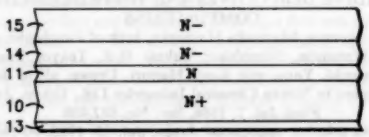
EPITAXIAL FRONT SEAL FOR A WAFER

Daniel J. Sullivan, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 12, 1986, Ser. No. 929,320

Int. Cl.[4] H01L *29/36, 29/38*

U.S. Cl. 148—33.5 **5 Claims**



1. A semiconductor wafer having a seal layer to reduce autodoping during subsequent growth of additional epitaxial

layers, comprising: a semiconductor wafer of a first conductivity; a first epitaxial layer covering the semiconductor wafer to serve as the seal layer and being of the first conductivity and having a thickness in the range of 10 to 15 micrometers; and a second epitaxial layer covering the first epitaxial layer, wherein the seal layer has a resistivity of the order of 0.1 ohm cm for an N-type conductivity and a resistivity in the range of 0.5 to 4.5 ohm cm for a P-type conductivity wherein the semiconductor wafer has a maximum resistivity of 0.0055 ohm cm.

4,696,702

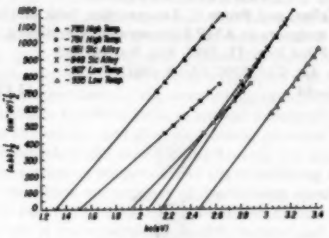
METHOD OF DEPOSITING WIDE BANDGAP AMORPHOUS SEMICONDUCTOR MATERIALS

Frank B. Ellis, Jr., Princeton Junction, and Alan E. Delahoy, Rocky Hill, both of N.J., assignors to Chronar Corp., Princeton, N.J.

Continuation of Ser. No. 694,650, Jan. 24, 1985, abandoned. This application Nov. 24, 1986, Ser. No. 933,972

Int. Cl.[4] H01L *21/205*

U.S. Cl. 437—88 **8 Claims**



1. The method of fabricating an amorphous silicon semiconductor material on a substrate which comprises:

decomposing one or more gaseous phase higher order silanes in the presence of a p-type catalytic dopant without photo-sensitization at a substrate temperature of about 200° C. and a pressure in the range from about 1 to 50 Torr to deposit on said substrate a p-type amorphous semiconductor material having a wide bandgap in the range from about 1.8 to 2.6 electron volts.

4,696,703

CORROSION RESISTANT AMORPHOUS CHROMIUM ALLOY COMPOSITIONS

Richard S. Henderson; Michael A. Tenhover, both of Solon, and Robert K. Grasselli, Aurora, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jul. 15, 1985, Ser. No. 755,247

Int. Cl.[4] C22C *27/00*

U.S. Cl. 148—403 **20 Claims**

1. An amorphous metal alloy of the formula

$$Cr_aM_bB_cC_dR_e$$

wherein

M is at least one metal selected from the group consisting of Mo, W, Nb and Ta;

R is at least one element selected from the group consisting of N, P, As, S and Se; and

wherein

a ranges from about greater than 0.4 to about 0.6;

b ranges from about 0.15 to about less than 0.4;

c ranges from zero to about 0.16;

d ranges from zero to about 0.2; and

e ranges from zero to about 0.3;

with the proviso that the sum of (c+d+e) ranges from about 0.04 to about 0.35.

4,696,704

MATERIAL FOR LEAD FRAMES

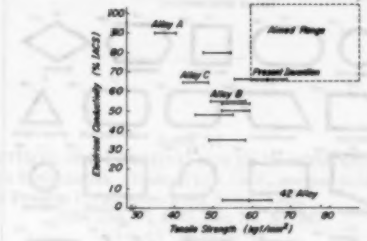
Kazumasa Takeuchi, Aichi; Takaharu Iwadachi, Handa, and Kazuo Ikushima, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed May 28, 1986, Ser. No. 867,440

Claims priority, application Japan, Jun. 13, 1985, 60-129048

Int. Cl.[4] C22C *9/06*

U.S. Cl. 148—412 **16 Claims**



1. A thin plate alloy for lead frames comprising 0.1–0.28% by weight of Be, 0.5–1.3% by weight of Ni, and a remainder being Cu and unavoidable impurities, said thin plate alloy having an electrical conductivity of at least 65% IACS, and a tensile strength of at least 56 kgf/mm^2.

4,696,705

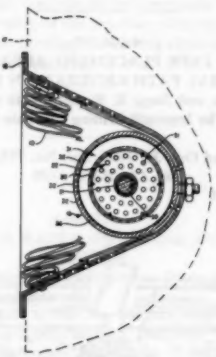
GAS GENERATING MATERIAL

Brian K. Hamilton, Littleton, Colo., assignor to TRW Automotive Products, Inc., Lyndhurst, Ohio

Filed Dec. 24, 1986, Ser. No. 946,376

Int. Cl.[4] C06B *45/02*

U.S. Cl. 149—21 **7 Claims**



1. A structure for generating gas, said structure comprising:

a grain made of an azide based material which generates gas and forms a sinter upon combustion,

said gas generating material including from about 2 to about 6% by weight of graphite fibers,

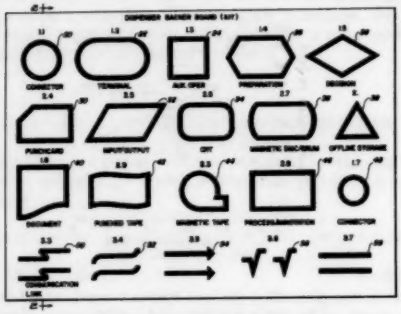
said graphite fibers having a diameter of 3–15 microns and an average length of 40 to 125 thousandths of an inch to reinforce the sinter which remains after combustion of the gas generating material.

4,696,706

METHOD OF USING LOGIC DESIGN ADHESIVE SYMBOLS

Kevin W. Griffin, 4085 Dianthus La., Titusville, Fla. 32796, and Robert P. Mallette, 119 E. Leon La., Cocoa Beach, Fla. 32931

Filed Oct. 31, 1985, Ser. No. 793,135
Int. Cl.[4] B32B *31/12*
U.S. Cl. 156—62 11 Claims



1. A method of preparing a functional logic diagram comprising the steps of:

(a) providing a plurality of distinct logic symbols, some of said logic symbols having different shapes corresponding to distinctly different logic functions, each logic symbol having a writing surface and an adhesive backing to allow all of the distinct logic symbols to be secured to a surface;

(b) storing the plurality of distinct logic symbols in a dispensing means;

(c) selecting from the plurality of distinct logic symbols, a logic symbol corresponding to a chosen logic function;

(d) removing from the dispensing means the selected distinct logic symbol; and

(e) attaching the selected distinct logic symbol in a position corresponding to the chosen logic function.

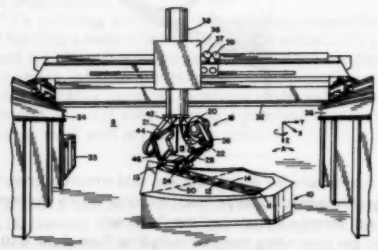
2. The method recited in claim 1 further comprising the step of writing upon said writing surface of said selected logic symbol.

4,696,707

COMPOSITE TAPE PLACEMENT APPARATUS WITH NATURAL PATH GENERATION MEANS

Henry W. Lewis, and Jorge E. Romero, both of Rockford, Ill., assignors to The Ingersoll Milling Machine Company, Rockford, Ill.

Filed Oct. 31, 1985, Ser. No. 794,172
Int. Cl.[4] B31D *1/00*
U.S. Cl. 156—64 44 Claims



1. A multi-axis tape laying machine for depositing composite tape in selected generally parallel courses upon a mandrel having a complex contoured surface to form thereon a conforming ply and for laying succeeding plies in like manner upon said first-mentioned ply to build a laminated structure upon said mandrel, said tape laying machine comprising:

a tape laying head movable in a plurality of axes under controlled power applied in accordance with control signals;

a control processor for receiving machine instructions and for generating said control signals in accordance with said machine instructions; and

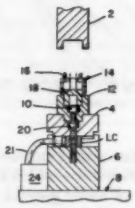
means for generating said machine instructions defining the natural path of each selected tape course on the surface of said mandrel from a representation of said surface, an incremental step distance of movement along said natural path, and the width of said tape.

4,696,708

ULTRASONIC WELDING

Joseph R. Keller, and Bruce C. Longenecker, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 13, 1985, Ser. No. 797,583
Int. Cl.[4] B29C *65/08*; G01N *29/00*
U.S. Cl. 156—64 13 Claims



1. A method of measuring the relative ultrasonic energy coupled to a load cell through a workpiece to be welded in an ultrasonic welding operation, the method comprising the steps of:

placing said workpiece in a work holder, said workholder being disposed beneath, and being spaced from, an ultrasonic welding horn, with said load cell supported beneath said workholder in a mechanically preloaded condition so that said load cell produces an output signal proportional to the amplitude of the ultrasonic energy to which the load cell is couple through the workpiece;

starting, upon the initiation of the welding operation, a timer arranged to run for a predetermined welding period of time;

processing the output signal of the load cell to produce a sinusoidal voltage which is instantaneously proportional to the ultrasonic energy coupled through the workpiece to the load cell;

summing said voltage over time so as to be proportional to the accumulated ultrasonic energy applied to the workpiece;

generating a reference voltage of a value corresponding to the accumulated ultrasonic energy that should have been applied to the workpiece during said predetermined period of time in order satisfactorily to weld the workpiece;

comparing said summed voltage with said reference voltage; and

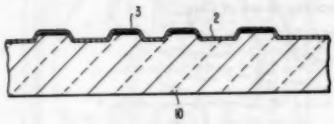
generating a success signal if the value of said summed voltage reaches the value of said reference voltage whilst said timer is running.

4,696,709

PROCESS FOR PRODUCTION OF AN EXPANDED POLYOLEFIN PANEL

Werner Hargarten, Windeck/Hoppengarten, and Rudolf Kautz, Hennef, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Filed Jun. 19, 1985, Ser. No. 746,532
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1984, 3422682
Int. Cl.[4] B32B *31/14, 5/20*
U.S. Cl. 156—79 6 Claims



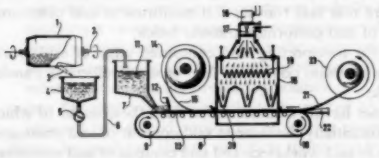
1. A process for producing a foamed polyolefin panel wherein a polyolefin or a mixture of a polyolefin with rubber and/or with a synthetic resin miscible therewith is blended homogeneously with a crosslinking agent and a chemical blowing agent and shaped into a panel-like matrix below decomposition temperature of the blowing agent and below the activation temperatuare of the crosslinking agent, and a film of a thermoplastic synthetic resin, is applied unilaterally or bilaterally to the matrix, and then the matrix, provided with the film, is crosslinked and expanded by heating to a temperature above the activation temperature of the crosslinking agent and the decomposition temperature of the blowing agent, characterized in that the film is imprinted on one surface side with printing ink in correspondence with a pattern and is placed with the printed surface side onto the matrix, and that, during expansion and crosslinking of the matrix, the areas provided with printing inks are caused to expand somewhat more vigorously than the areas not provided with printing inks, so that slightly raised printed areas are formed on the surface of the expanded polyolefin panel.

4,696,710

METHOD OF MANUFACTURING A COMPOSITE REINFORCED STRUCTURE OF CERAMICS MATERIAL

Louis Minjolle, Tarbes; Claudette Drouet, Juillan; Alain Hordonneau, Saint Aubin de Medoc, and Bernard Capdepuy, Saint Medard en Jalles, all of France, assignors to Ceramiques et Composites, Courbevoie, France

Continuation of Ser. No. 829,863, Feb. 18, 1986, abandoned, which is a continuation of Ser. No. 614,076, May 25, 1984, abandoned. This application Nov. 20, 1986, Ser. No. 933,275
Claims priority, application France, May 25, 1983, 83 08573
Int. Cl.[4] B32B *18/00, 31/26*
U.S. Cl. 156—89 9 Claims



1. A method of forming a composite structure comprised of ceramic material reinforced with refractory fibers, said method comprising the steps of:

providing a slip comprised of a ceramic powder, a synthetic resin capable of wetting said ceramic powder and said refractory fibers, and a solvent for said synthetic resin;

spreading said slip on moving belt means;

introducing refractory fibers into said slip;

drying said slip to eliminate the liquid phase and form a sheet;

stacking a plurality of said sheets;

heating the resultant stack to join said plurality of sheets to form said composite structure; and

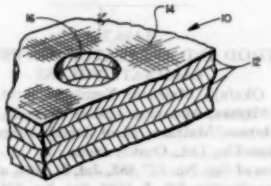
sintering said ceramic material in said composite structure without degrading said refractory fibers.

4,696,711

METHOD FOR FORMING HOLES IN COMPOSITES

Longin B. Greszczuk, Mission Viejo, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sep. 30, 1983, Ser. No. 537,867
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—173 6 Claims



1. A method for the formation of holes in composite structure comprising the steps of:

forming composite structure impregnated with a matrix material;

B-staging the composite structure;

cutting an appropriate size hole in the composite structure;

inserting a male forming die in the composite structure;

completing the curing of the structure with the die in place;

removing the male forming die leaving close tolerance hole in the composite structure.

4,696,712

SEMICONDUCTOR WAFER MOUNTING AND CUTTING SYSTEM

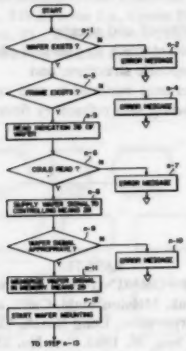
Yuzo Nonaka, Chiba, Japan, assignor to Disco Abrasive Systems, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 646,326, Aug. 31, 1984, abandoned. This application Oct. 25, 1985, Ser. No. 791,488
Claims priority, application Japan, Nov. 7, 1983, 58-207496
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—351 10 Claims

1. A semiconductor wafer mounting and cutting system including a wafer mounting machine for mounting a semiconductor wafer to a frame and a wafer cutting machine for receiving the frame and the wafer mounted thereto fed from said wafer mounting machine and cutting the wafer as required, said system comprising

controlling means for forming a relative relation signal showing a relative relation between a first indication means which has been or is applied to the frame and a

second indication means of the wafer, which wafer has been or is mounted to the frame and



memory means for memorizing the relative relation signal formed by said controlling means.

4,696,713

METHOD AND APPARATUS FOR PRESSING LAMINATED GLASS

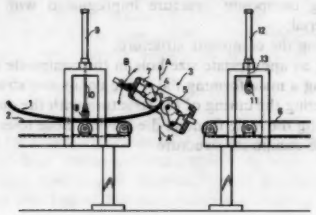
Masaharu Okafuji, Maizuru; Yoshinori Ochi, Nishinomiya; Atsushi Miyake, Maizuru; Junichi Noguchi, Maizuru, and Ichiro Matsuo, Maizuru, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Continuation of Ser. No. 627,858, Jul. 5, 1984, abandoned. This application Feb. 5, 1986, Ser. No. 825,964

Claims priority, application Japan, Jul. 5, 1983, 58-122198

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—358 **19 Claims**



1. A press roll apparatus for curved laminated glass, comprising:

a press roll unit having press rolls which press against the opposite sides of a laminated glass assembly having a curved surface to press it together;

press roll drive means for driving said press rolls to roll along the surface of the laminated glass and move it in a given direction;

a roll frame for rotatably supporting said press roll unit;

roll frame drive means for rotating said roll frame so that the pressure of the press rolls on the laminated glass assembly is normal to the glass surface;

a support frame for supporting said roll frame at various heights;

support frame drive means for shifting the height of said support frame;

memory means for storing a plurality of sets of data corresponding, respectively, to each of a series of locations along the curved surface of the laminated glass assembly in the direction of rolling through said apparatus, each set of data including:

first data representing the distance of the location along the surface of the glass, in said direction of rolling, from a reference location;

second data representing the angle of the surface of the glass at said location relative to a reference angle and

third data representing the height of the glass at said location relative to a reference height;

and means for operating said press roll, roll frame and support frame drive means in synchronism according to each set of data in succession such that said press rolls, said roll frame and said support frame are simultaneously driven from their respective locations corresponding to one set of data, to their respective locations corresponding to the next successive set of data.

4,696,714

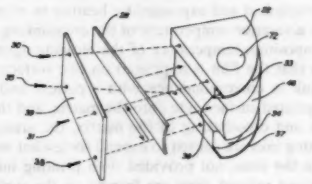
FOIL APPLICATOR

Theodore Voorhees, 331 Greenacres Dr., Anderson, Calif. 96007

Filed Jan. 22, 1986, Ser. No. 821,478

Int. Cl.[4] B31F *1/00*; **B32B** *31/00*; **B44C** *1/00*

U.S. Cl. 156—468 **3 Claims**



1. A foil applicator capable of applying decorative film from transfer foil to a contoured edge of a workpiece, comprising:

a base;

a preformed transfer block substantially rigidly attached to said base having a contoured face with a contour substantially the same as the contour of said contoured edge of said workpiece to which said transfer foil is to be applied;

heating means for heating said contoured face of said preformed transfer block so that said transfer foil substantially conforms to said contoured face when pulled taut against said contoured face;

means for routing said transfer foil to said preformed transfer block and over said contoured face of said preformed transfer block;

tension means for maintaining tension on said transfer foil to ensure that said transfer foil conforms to said contoured face of said preformed transfer block;

means for transporting said contoured edge of said workpiece past said contoured face of said preformed transfer block;

a hammer having a contoured surface the contour of which is substantially the same as said contour of said contoured edge of said workpiece and said contour of said contoured face of said preformed transfer block, positioned in close proximity to said preformed transfer block, and

activating means for pounding said hammer against said transfer foil and said contoured edge of said workpiece

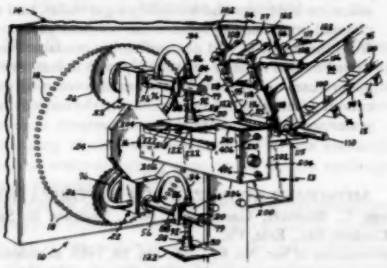
whereby said decorative film from said transfer foil heated by and conformed to said contour of said contoured face of said preformed transfer block is securely adhered to said contoured edge of said workpiece.

4,696,715

PICK-AND-PLACE GLUE APPLICATOR

Melford J. Bahr, Corcoran, Minn., assignor to MGS Machine Corporation, Minneapolis, Minn.

Filed Feb. 11, 1986, Ser. No. 828,389
Int. Cl.[4] B65C 9/12
U.S. Cl. 156—568 11 Claims



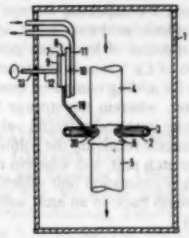
1. A pick-and-place glue applicator comprising:
a frame member;
a support shaft supported on said frame member;
means for mounting said support shaft to rotate about a secondary axis of rotation;
a suction cup secured to said support shaft and extending radially therefrom to a suction end;
means for rotating said support shaft about said secondary axis and simultaneously moving said shaft in an orbit about a primary axis parallel to and spaced from said secondary axis with said support shaft rotating in a direction opposite from a direction of rotation of said primary axis with said suction cup following a repeating path as such support shaft completes an orbit, said repeating path including a plurality of outwardly projecting positions with said cups projecting away from said primary axis and a plurality of connecting paths connecting said positions with said cups in said connecting paths projecting into an area bounded by said repeating path;
said means for rotating said support shaft being arranged for said cup to move in a generally hypotrochoidal path having distinct outwardly projecting positions and having connecting paths between said positions with generally linear portions; said means for applying said glue positioned adjacent one of said linear portions;
means for producing a vacuum;
means for releasing a vacuum;
means for alternately connecting said cup to said vacuum means and vacuum release means;
said means for alternately connecting said cup to said vacuum means and vacuum release means includes means for applying a vacuum to a cup approaching one of said outwardly projecting positions and maintaining said vacuum as said cup passes said means for applying said glue to a subsequent outwardly projecting position;
means for supporting an article to be picked by said cup adjacent one of said outwardly projecting positions;
means for applying glue to an article supported by a cup as said cup moves along a connecting path; and
said means for applying said glue being supported by said frame member and extending into a center of said orbit and presenting a glue applying surface opposing a linear portion of a connecting path and spaced therefrom a distance for an article carried by a cup to contact said glue applying surface to transfer glue from said surface to said carried article.

4,696,716

APPARATUS FOR DOPING SEMICONDUCTOR RODS WITH SOLID DOPANTS

Wolfgang Keller, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,218
Claims priority, application Fed. Rep. of Germany, May 20, 1985, 3518073
Int. Cl.[4] C30B 13/10, 13/12
U.S. Cl. 156—605 12 Claims



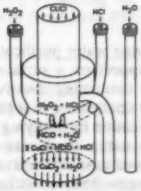
1. An arrangement for doping a semiconductor rod, the arrangement comprising an enclosure for the semiconductor rod and the semiconductor rod having a crucible-free, localized float-zone, dopant pellets are introduced to the float-zone, the arrangement having at least one hopper for introducing the dopant pellets, the hopper having an exit port connected to an outlet conduit directed at the float-zone, the hopper is mounted on the inside of said enclosure, and means for operating the hopper from the outside of said enclosure.

4,696,717

PROCESS FOR AUTOMATICALLY REGENERATING COPPER CHLORIDE ETCH SOLUTIONS

Werner D. Bissinger, Sindelfingen, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 15, 1985, Ser. No. 787,560
Claims priority, application European Pat. Off., Oct. 19, 1984, 84112630.3
Int. Cl.[4] C23F 1/46
U.S. Cl. 156—642 16 Claims



1. A process for regenerating an aqueous copper chloride etch solution form a separate etch unit which, in a depleted state, includes more than about 6 g/l Cu^+ ions as copper (I) chloride, a reduced amount of copper (II) ions as copper (II) chloride, less than about 30 ml/l 32 percent HCl and sodium chloride comprising:
(i) converting a quantity of H_2O_2 corresponding to the copper (I) ion concentration in the solution in its depleted

state into HClO by combining the H_2O_2 in a separate oxidation reactor with a stoichiometric quantity of HCl;

(ii) immediately thereafter in the oxidation reactor allowing the HClO to combine with the solution in its depleted state to accomplish oxidation of copper (I) chloride to copper (II) chloride by the HClO to provide a regenerated solution; and

(iii) transferring the regenerated solution to a separate regeneration unit in sufficient quantity that the CU^+ ion concentration of the solution in the regeneration unit is decreased to less than about 6 g/l.

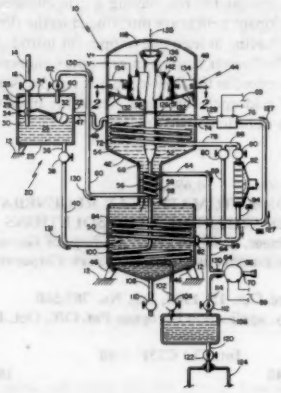
13. A regeneration system for implementing the process according to claim 1 comprising storage tanks for hydrogen peroxide, hydrochloric acid and water, a redox electrode for controlling the addition of hydrogen peroxide responsive to the concentration of Cu^+ ions in the solution, solenoid valves or dosing pumps for adding computed quantities of hydrochloric acid and water, wherein the storage tanks are connected through connecting lines and solenoid valves or dosing pumps to an oxidation reactor receiving the solution to be regenerated from the separate etch unit, and wherein the oxidation reactor is connected to a regeneration unit which includes a connecting line with a pump back to an etch unit and an overflow to an overflow tank.

4,696,718

WATER PURIFICATION DEVICE

Henry C. Lasater, P.O. Box 616, Cuba, N. Mex. 87013

Filed Feb. 4, 1986, Ser. No. 826,083
Int. Cl.[4] B01D *3/02*
U.S. Cl. 202—176 **20 Claims**



1. An energy conserving water purification device comprising: means enabling support on a surface for degassing and distilling impure water containing dissolved gases and other solid impurities and for connecting to a power source and for accomplishing degassification by applying a partial vacuum to the water, such partial vacuum producing a thermal side effect sufficient that the removed gases are warmed and the degassed water cooled during degassification, including,

a degassification apparatus for extracting the dissolved gases from the impure water and including a degassification container for receiving the impure water and having a top, a bottom and a water inlet and outlet, said container constructed and arranged to be selectively sealable so as to maintain at least a partial vacuum therein;

a distillation apparatus for removing the solid impurities from the impure water and connected in fluid flow relationship with said outlet of said degassification container to receive degassed water therefrom, said distillation apparatus including a boiler, a condenser and a purified water reservoir;

means for selectively establishing a partial vacuum in said degassification container and in said distillation apparatus for causing to be produced cooled, degassed water and warmed removed gases above said cooled degassed water in said container and to produce a lowered boiling point for water in said distillation apparatus; and

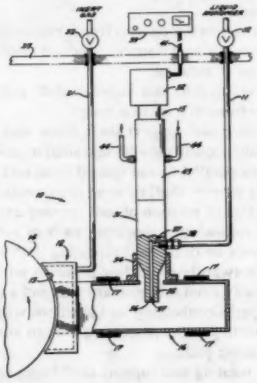
a gas exhaust channel extending from said top of said degassification container and including a gas outlet, said exhaust channel positioned to receive the warmed gases removed from the water in said degassification container and positioned in heat transfer relationship with at least one of said apparatuses to transfer heat from the warmed gases received within said exhaust channel to the cooled, degassed water so as to warm the degassed water.

4,696,719

MONOMER ATOMIZER FOR VAPORIZATION

Gregg C. Bischoff, Gansevoort, N.Y., assignor to Spectrum Control, Inc., Erie, Pa.

Continuation of Ser. No. 692,746, Jan. 18, 1985, abandoned. This application Aug. 25, 1986, Ser. No. 900,241
Int. Cl.[4] B01D *3/06, 3/10*
U.S. Cl. 202—205 **8 Claims**



1. An atomizer for liquids to be vaporized comprising, in combination, an elongated unitary structure having a tip portion at one end, an ultrasonic vibration device coupled to the opposite end of said structure, means for energizing said device to impart ultrasonic vibration to said tip portion, the tip portion having an end surface and defining a capillary passage ending at said end surface, the tip being mounted such that the end surface is located at approximately one-quarter wavelength from a nodal position and means for conveying liquid to said passage for liquid flow onto said surface and dispersion into atomized liquid particles.

4. A liquid vaporization apparatus comprising, in combination, a vacuum chamber, a heated vaporization chamber mounted in said vacuum chamber, an elongated unitary structure mounted in said vacuum chamber including a tip portion at one end extending into said vaporization chamber, an ultrasonic vibration device coupled to the opposite end of said structure, means for energizing said device to impart ultrasonic vibration to said tip portion, said tip portion having an end surface located approximately one-quarter wavelength from a nodal position and defining a capillary passage ending at said end surface, means for conveying liquid to said passage for liquid flow onto said surface and dispersion into atomized liquid particles to be vaporized, a cooling chamber interposed in said structure between said vaporization chamber and said device, and means for flowing cooling fluid through said

chamber so as to thermally isolate the device from the vaporization chamber.

4,696,720

REMOVAL OF WATER FROM AQUEOUS ALCOHOL MIXTURES

Donald L. Kiser, Muscatine, Iowa, assignor to Grain Processing Corporation, Muscatine, Iowa

Filed May 12, 1986, Ser. No. 862,049
Int. Cl.[4] B01D *15/00*
U.S. Cl. 203—19 9 Claims

1. A process for removing water from a water-containing alcohol which comprises passing a low molecular weight hydrophilic liquid dehydrating agent through a bed of ion exchange resin to remove water therefrom, then passing a water-containing alcohol through said bed of ion exchange resin until the water-absorbing capacity of the ion exchange resin falls to a predetermined level.

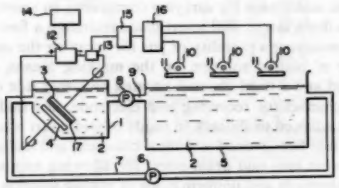
4. A process for removing water from a water-containing alcohol which comprises passing a water-containing alcohol through a bed of ion exchange resin until the water-absorbing capacity of the ion exchange resin falls to a predetermined level, then passing a liquid regenerating agent through said ion exchange resin bed to restore the water absorbing capacity.

4,696,721

ELECTROFORMING METHOD AND ELECTROFORMING APPARATUS

Hiroyuki Higashino, Yokohama, and Hideki Ohkawa, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 22, 1986, Ser. No. 944,513
Claims priority, application Japan, Dec. 27, 1985, 60-293120; Feb. 13, 1986, 61-29304
Int. Cl.[4] C25D *1/00*
U.S. Cl. 204—3 23 Claims



1. An electroforming method comprising the steps of immersing a conductive matrix and an insoluble electrode having a high oxygen overvoltage, in an electroforming solution, containing sulfamate ions, which is held in an electroforming tank, applying voltage between said conductive matrix and insoluble electrode, to electrolyze said electroforming solution, thereby to deposit a metal layer on the surface of said matrix, wherein electromagnetic radiation, having a wavelength shorter than 400 nm, is emitted to said electroforming solution.

4,696,722

LOW COST TOOLING REPLICATION TECHNIQUE

Howard E. Towlson, Baldwinsville, N.Y., assignor to General Electric Company, Princeton, N.J.

Filed Mar. 24, 1986, Ser. No. 843,439
Int. Cl.[4] C25D *1/10*
U.S. Cl. 204—6 17 Claims

1. A method of replicating glass pressing tools capable of producing precision complex optical surfaces in molten glass comprising the steps of:

passivating a master glass pressing surface which is to be replicated;

plating a metal on said master glass pressing surface to a thickness sufficient to give the plated metal mechanical strength;

separating the plated metal from said master glass pressing surface to reveal a negative master surface;

passivating said negative master surface;

plating the negative master surface with a plating metal selected to withstand a glass working temperature of around 1000° C. and the abrasive properties of a molten glass being pressed to a thickness sufficient to give the plated metal mechanical strength; and

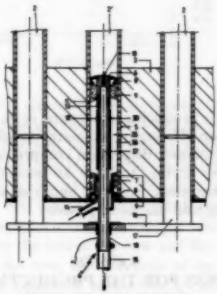
separating the plated metal from said negative master surface to reveal a replication of said master glass pressing surface.

4,696,723

PROCESS FOR REPAIRING THE TUBES OF A STEAM GENERATOR

Herman Bosquet, Kallo, and Stanislas F. Ulens, Belsele, both of Belgium, assignors to N.V. Verenigde Energiebedrijven Van Het Scheldeland Mechelsesteenweg, Antwerp, Belgium

Filed May 8, 1985, Ser. No. 732,030
Claims priority, application Belgium, May 11, 1984, 0/212.910
Int. Cl.[4] C25D *3/12, 7/04*
U.S. Cl. 204—16 3 Claims



1. A process for repairing the tubes (2) of steam generators by supplying an impervious internal metallic sleeve for covering a defective area, characterised in forming said sleeve by electrolytically depositing nickel from a nickel sulphamate soulution free from chlorine along the defective area (26) of the internal wall of the tube (2'), said depositing step including providing a closed cavity by sealing the front part (26) of the tube (2') along a length of from 20 to 80 cm in the manner of an electrolytic cell.

4,696,724

SURFACE TREATMENT OF HIGH-NICKEL/IRON ALLOY STEEL PLATE FOR LNG OR LPG TANKS

Takenori Deguchi; Kazuko Uchida; Takao Ikita, all of Chiba; Shigeaki Maruhaski, Yamaguchi; Kazuo Hoshino, Yamaguchi, and Keiji Oosaki, Yamaguchi, all of Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Division of Ser. No. 652,611, Sep. 20, 1984, Pat. No. 4,592,965, which is a continuation-in-part of Ser. No. 392,131, Jun. 25, 1982, abandoned. This application Mar. 27, 1986, Ser. No. 844,979
Claims priority, application Japan, Jun. 26, 1981, 56-98216
Int. Cl.[4] C23C *22/24, 28/00*
U.S. Cl. 204—27 4 Claims

1. A method of increasing the corrosion resistance of a nickel/iron alloy steel plate for LNG or LPG tanks said plates

having a 35–37% nickel content as provided by ASTM SA-658 comprising the steps of:

(1) coating said steel with metallic nickel in an amount of about 1 to 10 g/m^2 calculated as nickel metal; and

(2) surface treating said nickel/iron alloy steel plate coated with metallic nickel with a chromating step so as to provide a chromate film on said metallic nickel coating, said chromate film containing 5 to 100 mg/m^2 of chromate calculated as chromium metal.

4,696,725

MAGNETIC CORE AND PREPARATION THEREOF

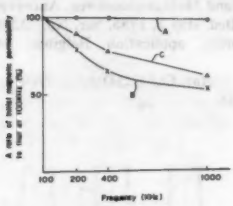
Kumi Ochiai, Yokohama; Hiromichi Horie, Yokosuka; Itsuo Arima, Kawasaki; Mikio Morita, and Hisato Kamohara, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Apr. 16, 1986, Ser. No. 852,719

Claims priority, application Japan, Jun. 26, 1985, 60-137941; Sep. 12, 1985, 60-200565

Int. Cl.^{4} C04B *35/04*; H01F *1/26*

U.S. Cl. 252—62.54 **19 Claims**



1. A process for producing a magnetic core, consisting essentially of a first step of bringing magnetic powder of a metal into contact with a polymer dispersion comprising polymer particles, followed by drying, to form an insulating layer on the surface of said magnetic powder, and a second step of compression molding said magnetic powder.

4,696,726

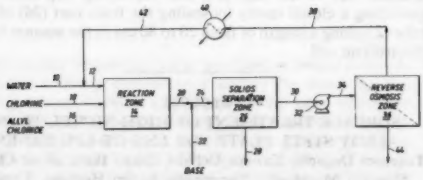
PROCESS FOR THE PRODUCTION OF DICHLOROHYDRIN

George C. Blytas; F. Norman Grimsby, both of Houston, Tex., and John F. Scamehorn, Norman, Okla., assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 14, 1986, Ser. No. 885,519

Int. Cl.^{4} B01D *13/02*

U.S. Cl. 204—182.4 **5 Claims**



1. A continuous process for the production of dichlorohydrin which comprises:

(a) reacting allyl chloride, water and chlorine in a reaction zone to form an aqueous reaction mixture of dichlorohydrin and reaction by-products,

(b) passing said reaction mixture from said reaction zone as feed to a reverse osmosis zone,

(c) subjecting said feed to reverse osmosis to afford: (1) a retentate stream having a dichlorohydrin content higher than said feed, and (2) a permeate stream having a dichlorohydrin content less than about 10 per cent of the dichlorohydrin content in said feed,

(d) withdrawing said retentate stream, and

(e) recycling at least part of said permeate stream to said reaction zone in an amount from about 25 to about 90% by volume of the volume of the total amount of water fed to said reaction zone.

4,696,727

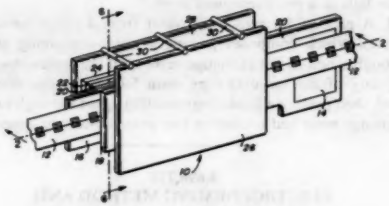
UNIVERSAL SELECTIVE PLATING HEAD

Sand Mukhtar, San Jose, and Syed A. Husain, Fremont, both of Calif., assignors to Automated Semiconductor, Inc., San Jose, Calif.

Filed Nov. 12, 1986, Ser. No. 929,721

Int. Cl.^{4} C25D *17/00*

U.S. Cl. 204—206 **6 Claims**



1. A universal selective plating head comprising:

a masking means for controlling the area and the pitch of a sample to be plated, said masking means including a plurality of mask apertures; and

a multipitch centerline feed block including a universal nozzle block and an electrode with said electrode extending lengthwise along the feed block, and means for spraying a uniform blade of plating solution on said masking means, said means for spraying comprising an insert blade and a drain insert, said insert blade including a first channel containing a plurality of jets for spraying the uniform blade of plating solution on the masking means, and a second and a third channel situated on either side of said first channel for receiving said electrode, and said drain insert adapted to slidably fit inside of said insert blade and over said first, second and third channels, and including a space cut into said drain insert for allowing exposure of said electrode and uniform blade of plating solution to the masking means, said drain insert also including a plurality of raised landings to create drainage passageways through which plating solution can drain away from the masking means after spraying.

4,696,728

APPARATUS FOR MASS ELECTROPLATING OF BULK GOODS

Siegfried Birkle, Höchstadt/Aisch, and Johann Gehring, Spardorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 11, 1986, Ser. No. 906,037

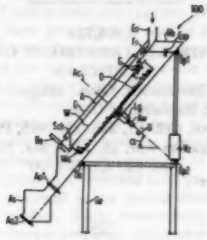
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533151; May 15, 1986, 3616429

Int. Cl.^{4} C25D *17/16*

U.S. Cl. 204—213 **21 Claims**

1. In an apparatus for mass electroplating of bulk goods, particulary for the electro-deposition of aluminum from an aprotic, oxygen-free and water-free, aluminum-organic electrolyte, said apparatus comprising a plating tank for the acceptance of an electrolyte, a goods carrying dish having an axis and a floor; means for mounting the goods carrying dish in the tank for rotation around an inclined axis and immersed in the

electrolyte; and at least one disk-shaped anode being immersed in the electrolyte and aligned mainly parallel to the floor of the goods carrying dish, said dish having at least one dog for



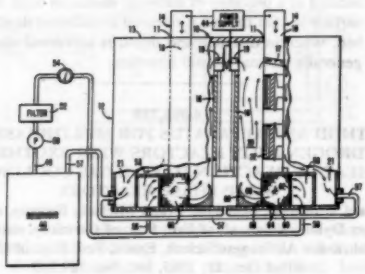
spreading the bulk goods on the floor of the carrying dish, the improvements comprising the dog being formed by a helically extending track.

4,696,729

ELECTROPLATING CELL

Hugo A. A. Santini, San Jose, Calif., assignor to International Business Machines, Armonk, N.Y.

Filed Feb. 28, 1986, Ser. No. 834,699
Int. Cl.[4] C25D *17/06, 17/16*
U.S. Cl. 204—224 R **12 Claims**



1. An electroplating cell comprising:

first and second spaced wall members fixed in position to define a channel which provides a flow path for plating solution between said wall members;

a first elongated electrode forming at least part of said first wall member;

a second elongated electrode forming at least part of said second wall member, said second electrode including an article to be plated;

input means for introducing a plating solution under pressure to said plating cell;

an isostatic chamber for receiving plating solution from said input means and for discharging said plating solution into said flow path at a substantially equal predetermined pressure over the entire area of said flow path so that a uniform laminar flow of said plating solution is produced along the length of said flow path; and

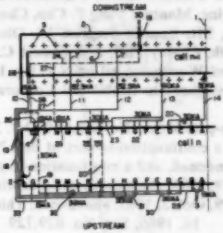
means for producing a uniform current density across said electrodes in the presence of said laminar flow of said plating solution whereby a film of uniform thickness is plated on said article.

4,696,730

CIRCUIT FOR THE ELECTRICAL CONNECTION OF ROWS OF ELECTROLYSIS CELLS FOR THE PRODUCTION OF ALUMINUM AT VERY HIGH CURRENT

Joseph Chaffy, and Bernard Langon, both of Saint Jean de Maurienne, France, assignors to Aluminium Pechiney, Paris, France

Filed Jun. 5, 1986, Ser. No. 870,850
Claims priority, application France, Jun. 5, 1985, 85 08923
Int. Cl.[4] C25C *3/16*
U.S. Cl. 204—243 M **9 Claims**



1. In a circuit for electrical connection between at least two successive cells of rank n and rank n+1 in a row of cells for the production of aluminium by electrolysis of alumina dissolved in molten cryolite by the Hall-Heroult process at a total electrolysis current J higher than 250,000 amperes, and possibly attaining 300 to 600 kA, each cell being constituted by an insulated parallelepiped metal container of which the large axis is perpendicular to the axis of the row and the small axis parallel to the axis of the row, the two ends of the container comprising heads, the container supporting a cathode formed by the juxtaposition of carbonaceous blocks in which there are sealed metal rods of which the rod ends issue from the container generally on its two large upstream and downstream sides relative to the direction of the current in the line, each cell also comprising an anode system formed by at least one horizontal rigid beam supporting at least one horizontal conducting rod comprising an anode frame on which the shafts for suspension of the anodes are attached, the circuit for connection between two successive cells being constituted by cathode collectors which are connected on the one hand to the cathode outputs of the cell of rank n and on the other hand to the connecting conductors which join, via risers, the anode frame of the cell of rank n+1 in the row, the improvement comprising the anode frame (6) of the cell of rank n+1 in the row being supplied with current simultaneously via a plurality of upstream risers such as (11, 12, 13) which are substantially equidistant and symmetrical relative to the vertical plane containing the small axis (1) of the cell and by at least two downstream risers (15) (15S) which are substantially symmetrical to this same vertical plane, these downstream risers (15, 15S) being supplied by conductors connected to the downstream cathode outputs (4) of the cell of rank n, at least one portion (24) of these connecting conductors passing beneath the cell of rank n+1 along a path substantially parallel to the large axis of this cell, the direction of the current in these portions (24) of conductors passing from the heads (17) towards the small axis (1) of the cell.

4,696,731

AMORPHOUS METAL-BASED COMPOSITE OXYGEN ANODES

Michael A. Tenhover, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 16, 1986, Ser. No. 942,175
Int. Cl.[4] C25B 1/02
U.S. Cl. 204—290 R 40 Claims

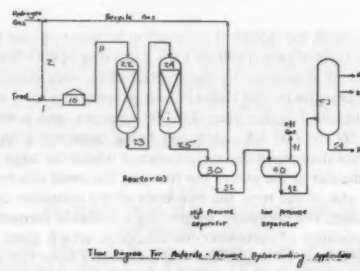
1. Amorphous metal-based composite anodes comprising:
a substrate material;
a first coating of an amorphous metal alloy applied thereto; and
a second coating of a mixed metal oxide applied to said first coating and fused therewith.

4,696,732

SIMULTANEOUS HYDROTREATING AND DEWAXING OF PETROLEUM FEEDSTOCKS

Philip J. Angevine, Mantua; Yung F. Chu, Cherry Hill; Kenneth M. Mitchell, Mt. Laurel; Stephen M. Oleck, Moorestown; Stuart S. Shih, Cherry Hill, and Robert C. Wilson, Jr., deceased, late of Woodbury, all of N.J. (by Lillian S. Wilson, executrix), assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 665,604, Oct. 29, 1984, Pat. No. 4,568,655, and a continuation-in-part of Ser. No. 665,605, Oct. 29, 1984, abandoned, and a continuation-in-part of Ser. No. 683,755, Dec. 19, 1984, abandoned, and a continuation-in-part of Ser. No. 783,399, Oct. 3, 1985, abandoned. This application Feb. 14, 1986, Ser. No. 829,729
Int. Cl.[4] C10G 45/08, 45/12, 45/64, 47/20
U.S. Cl. 208—111 13 Claims



Flow Diagram For Hydrode-Aromex Dybecombing Application

1. A process comprising the steps of simultaneous demetallating, hydrodesulfurizing and dewaxing petroleum residua at least 50% of which boils above 750° F. by contacting said residua with a catalyst, comprising:
(a) a hydrogenation/dehydrogenation component supported on catalytically active alumina, said alumina having a controlled pore size whereby said catalyst has 75% of its pore volume in pores no greater than 100 Angstrom units in diameter, and about 20% of its pore volume in pores greater than about 300 Angstrom units in diameter; and
(b) an intermediate pore zeolite, and zeolite beta as a large pore component and a large pore non-zeolitic inorganic binder.

4,696,733

PROCESS FOR SELECTIVELY HYDROGENATING POLYCONDENSED AROMATICS

Ying-Yen P. Tsao, Langhorne, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 17, 1984, Ser. No. 651,008
Int. Cl.[4] C10G 45/00
U.S. Cl. 208—144 12 Claims

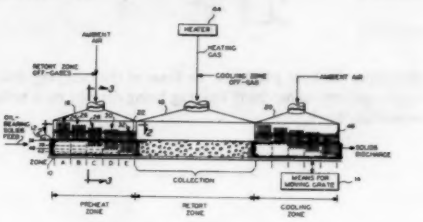
1. A process for preparing hydrogenated or partially hydrogenated polynuclear aromatic hydrogen donors from a hydrocarbon feed comprising polynuclear aromatic hydrogen acceptors, single ring aromatic hydrogen acceptors and double ring aromatic hydrogen acceptors, wherein said polynuclear aromatics are selectively hydrogenated by contacting said feed with hydrogen in the presence of maganese nodules.

4,696,734

METHOD FOR GAS TREATMENT OF A BED OF PARTICLES

Cecil C. Gentry, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 692,457, Jan. 18, 1985, Pat. No. 4,606,138. This application Apr. 28, 1986, Ser. No. 856,529
Int. Cl.[4] C10G 1/00
U.S. Cl. 208—407 6 Claims



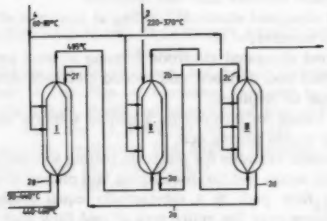
1. A method for gas treating a bed of solid particles supported on a surface of a grate comprising:
(a) moving the bed of particles in a generally horizontal direction by moving the grate in said direction;
(b) releasing the gas, during step (a), into the bed from the open ends of a plurality of conduits, said open ends being located at a plurality of different distances from the grate surface so that the gas is released at different depths in the bed, wherein distance and depth is measured along lines generally normal to said direction.

4,696,735

METHOD AND APPARATUS FOR MULTIPHASE COAL HYDROGENATION REACTORS WITH EXOTHERMAL HEAT OF REACTION HAVING GAS COOLING IN SUMP-PHASE REACTORS

Eckard Wolowski, Mülheim; Frank Mirtsch, Bottrop, and Herbert Dybus, Essen, all of Fed. Rep. of Germany, assignors to Ruhrkohle Aktiengesellschaft, Essen, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,799
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438606
Int. Cl.[4] C10G 1/00; B01J 10/00
U.S. Cl. 208—408 22 Claims



1. Method for cooling at least one reactor in a reaction process, said at least one reactor being a thermally loaded and pressurized coal product hydrogenation reactor operating in the sump phase, said method comprising the steps of:
introducing a multiphase reactant mixture into at least one

reaction chamber of said at least one reactor, said multiphase reactant mixture including at least two phases chosen from the group consisting of solid, liquid and gas;

passing a substantially completely gaseous component through passage means about said at least one reaction chamber of said at least one reactor, whereby a substantial portion of heat generated in said at least one reactor is transferred to said gaseous component;

injecting cold gas into said at least one reactor for cooling said reaction chamber and the reactants therein;

adjusting said injecting of cold gas to adjust the temperature of the reaction along and in said at least one reaction chamber within a substantially constant range, thereby reducing substantially the quantity of said injected cold gas from a quantity of injected cold gas injected when said gaseous component is not passed about said at least one reaction chamber, while maintaining said substantially constant temperature range along and in said at least one reaction chamber; and

recovering, in said reaction process, a substantial portion of the heat transferred to said gaseous component.

4,696,736

DEVICE FOR WASHING OUT ORGANIC LOAM-LIKE IMPURITIES FROM CONTINUOUSLY FED LARGE AND FINE GRANULAR SOLIDS

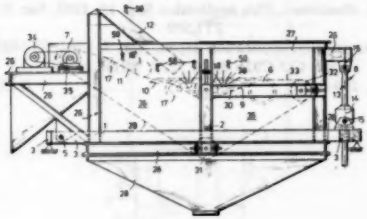
Klaus Bleh, Meckenheimer Strasse 6, 6701 Rodersheim-Gronau 1, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,843

Claims priority, application Fed. Rep. of Germany, May 18, 1985, 3517982

Int. Cl.[4] B03D 1/00

U.S. Cl. 209—173 **4 Claims**



1. A device for washing out organic and loam-like impurities from continuously fed large and fine granular solids, such as freshly dredged/excavated and prepared gravel, having a chute (12) feeding the material to a washing trough (30), and spray jets for establishing a flow rate of washing fluid, an endless conveyor belt (29) supported on support rollers located in the machine frame (1), an initial part (9) of the conveyor belt (29) in the direction of the material flow in the chute (12) providing the washing trough (30) with a second part (11) of the conveyor belt (29) beneath the chute (12),, said second part (11) being inclined upwards, the conveyor belt (29) being driven against the direction of flow of thematerial fed over the chute (12), and the conveyor belt (29) being height adjustably guided at the centre support (2) of the machine frame (1) by an upper pressure roller (18) to vary the depth of said trough (30) a deflecting roller (6) adjacent this pressure roller (18) for said initial part (9) of the conveyor belt (29), with which a further outboudn return roller (32) is associated within the machine frame (1), a section (33) of the conveyor belt (29) running horizontally is provided between the deflecting roller and the outbound return roller (6, 32) for retaining fine particles, and in which an outer return roller (7) of the belt section (11) situated beneath the chute (12) a machine frame (1,2,26) is pivotally mounted at one end on a base frame (3) by a journal axle bearer (4) extending transversely to the direction (10) of the conveyor belt (29), and the machine frame (1,2,26) is coupled at the opposite end to a height adjustment mechanism (8) whereby upon adjustment of said height mechanism (8) the inclination of the machine frame may be altered about the journal axle bearer and thereby the flow rate from the trough may be changed independently of aforesaid variance in the depth of said trough (30) thereby enabling more retention of fine particles on section (33) upon adjustment to less inclination about said journal axle bearer (4) and less retention upon adjustment to more inclination.

4,696,737

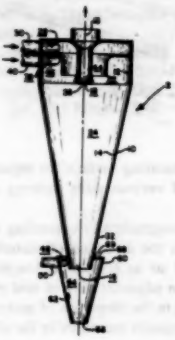
FIBER RECOVERY ELUTRIATING HYDROCYCLONE

Charles W. Bouchillon, Starkville, Miss., assignor to The Bauer Bros. Co., Springfield, Ohio

Filed Feb. 28, 1986, Ser. No. 834,999

Int. Cl.[4] B03D 1/00

U.S. Cl. 209—210 **4 Claims**



1. An improved method of centrifugally separating, cleaning or classifying solids contained in a fluid flow delivered to a hydrocyclone of the type having an axially elongated substantially conical separating chamber having an axially aligned rejects outlet at the apex end thereof and an axially aligned accepts outlet at the base end thereof wherein the solids containing fluid flow is introduced through an inlet means at the base end of the separating chamber in a substantially helical swirling flow pattern so as to establish within the conical separating chamber counterflowing inner and outer vortices inherently causing solids in the fluid flow which are lighter and relatively less dense to move to the inner vortex and exit through the accepts outlet as an accepts stream while causing solids in the fluid flow which are heavier and relatively more dense to move to the outer vortex and exit through the rejects outlet as an rejects stream, the improvement comprising:

a. introducing a secondary fluid flow having a solids content of less than about 0.2% by weight into the separating chamber of the hydrocyclone at the base end thereof in a substantially helical swirling flow pattern coaxially about the inner and outer vortices of the solids containing fluid flow so as to establish a reduced solids content boundary layer vortex along the wall of separating chamber rotating co-directionally with the outer vortex;

b. providing a substantially conical secondary housing coaxially about the apex end of the hydrocyclone defining an axially extending secondary separating chamber adapted to receive the rejects stream from the separating chamber of the hydrocyclone and having a rejects outlet at the apex end thereof through which the rejects stream exists the secondary separating chamber; and

c. introducing an additional flow of the secondary fluid into the secondary separating chamber in a substantially helical swirling flow pattern coaxially about the rejects stream entering the secondary separating chamber so as to establish a reduced solids content boundary layer vortex

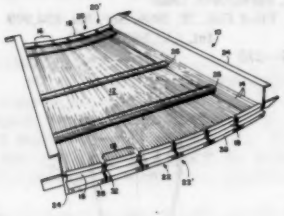
along the wall of the secondary separating chamber rotating co-directionally with the rejects stream entering the secondary separating chamber.

4,696,738

MATERIAL SEPARATING SURFACE

Charles N. Risley, 2949 SE. Walta Vista Ct., Milwaukie, Oreg. 97222

Filed Mar. 20, 1985, Ser. No. 714,002
Int. Cl.[4] B07B *1/04, 1/46*
U.S. Cl. 209—352 **4 Claims**



1. A material separating surface for separating bulk material having particles of various sizes flowing across said surface comprising:

(a) an array of longitudinally-extending members extending substantially in the direction of material flow, said members arranged so as to create longitudinally extending spaces between adjacent ones of said members, said members diverging in the direction of material flow so that the width of said spaces increases in the direction of material flow;

(b) each of said members including tensioned wire means for oscillating individually in response to vibratory stimulus;

(c) said array including two or more discrete, interchangeable panels, each of said panels including a plurality of said wire means; and

(d) frame means for supporting said tensioned wire means in diverging arrangement, said frame means including a plurality of longitudinally-extending compression members in diverging arrangement, said compression members being proximate to and substantially parallel to said tensioned wire means.

4,696,739

WATER PURIFICATION APPARATUS

John A. Pedneault, Bohemia, N.Y., assignor to Aqua Strip Corporation, Somers, N.Y.

Continuation of Ser. No. 595,619, Apr. 2, 1984, abandoned. This application Aug. 11, 1986, Ser. No. 894,748
Int. Cl.[4] C02F *1/78, 9/00*
U.S. Cl. 210—121 **5 Claims**

1. An apparatus for removing hydrocarbon contaminants from water comprising:

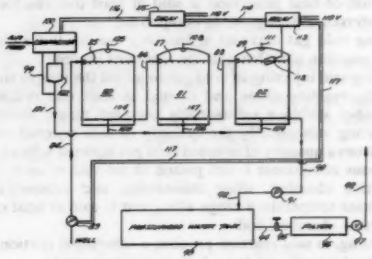
(a) a plurality of tubular chambers interconnected in series relationship to flow water therethrough with a water input means at one end and a water outlet means at the other end of each tubular chamber;

(b) first pump means to flow a contaminated water through a first water conduit means to the first of said plurality of tubular chambers, said first pump means being controlled by the water level in the last of said plurality of tubular chambers;

(c) second water conduit means at the other end of the last of said plurality of tubular chambers to flow a purified water to a reservoir;

(d) each of said plurality of tubular chambers having at the lower portion thereof means for injecting air into the water contained therein and at the upper end thereof outlet means for said injected air;

(e) means connecting the air outlet means of one tubular chamber with the air inlet means of the adjacent tubular chamber; and



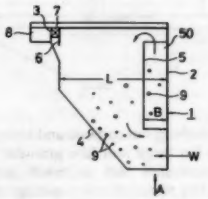
(f) compressor means controlled by the level of water in the last of said plurality of chambers with conduit means to flow the compressed air to the last of said plurality of chambers.

4,696,740

UNIT TYPE WASTE WATER TREATING APPARATUS

Tadao Mochizuki, Kamagaya; Akira Nakajima, Sagamihara, and Reizo Fukushima, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Kyoritsu Yuki Kogyo Kenkyusho, Japan

Continuation-in-part of Ser. No. 667,064, Nov. 1, 1984, abandoned, which is a continuation of Ser. No. 481,462, Apr. 1, 1983, abandoned. This application Sep. 19, 1985, Ser. No. 777,599
Claims priority, application Japan, Apr. 7, 1982, 57-56611
Int. Cl.[4] C02F *1/74, 3/22;* **B01D** *21/02*
U.S. Cl. 210—151 **8 Claims**



1. A unit type waste water treating apparatus having a variable treatment capacity, said apparatus comprising:

a plurality of identical treatment tanks communicating in series or parallel with each other, the capacity of said apparatus increasing as the number of tanks in said plurality of tanks increases;

each tank having a rectangular cross-sectional configuration defined by four side walls, one side wall of one tank of said plurality of tanks disposed closely adjacent to a side wall of an adjacent tank of said plurality of tanks, and each tank being loaded with a quantity of carrier particles separated from the carrier particles in an adjacent tank by said side walls;

means for admitting air and waste water to be treated into each tank;

vertical air lift means disposed in each tank;

said carrier particles being covered by sludge contained in said waste water so as to form activated sludge;

said air causing said carrier particles covered by said activated sludge to circulate in each tank through said air lift means together with said waste water;

said air lift means in each tank comprising a reaction zone and a remaining portion of each tank having substantially larger volume than said reaction zone forming a separation zone in which said activated sludge peels off from said carrier particles and floats upwardly, said reaction zone having a width B expressed by a relation

$$\frac{1}{4}L \geq B > 0$$

wherein L represents a horizontal length of the tank; and

at least one separator provided at an upper end of one side wall of each tank for discharging, by overflow, purified water and the sludge peeled off from said carrier particles, said separator comprising a plurality of spaced inclined plates;

a bottom portion of each tank on which said carrier particles tend to precipitate being inclined at an angle sufficient to cause said carrier particles to gravitate toward the base of said tank; and

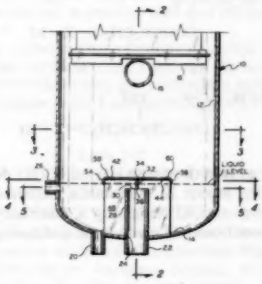
said air admitting means being provided for said base at a location beneath said air lift means.

4,696,741

VORTEX BREAKER FOR USE IN A LIQUID-LIQUID SEPARATOR OR THE LIKE

William C. Rahlwes, West Columbia, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 18, 1986, Ser. No. 853,328
Int. Cl.[4] B01D *21/24*
U.S. Cl. 210—232 **12 Claims**



1. In a vessel of the type in which two fluid phases are separated, said vessel having a side wall and a bottom wall, first liquid outlet means in the bottom wall, and fluid inlet means communicating with said vessel above said first liquid outlet means, the improvement comprising: means for breaking vortices including,

tubular conduit means in fluid flow communication with said first liquid outlet means and extending a distance vertically into said vessel, said tubular conduit means having a vertical longitudinal axis and an upper terminal end face opening into said vessel, said terminal end face lying ibn a generally horizontal plane;

center baffle plate means having an upper edge, a lower edge and opposite side edges and lying in a first vertical plane and extending upwardly from the upper terminal end face of said tubular conduit means with the vertical longitudinal axis of said tubular conduit means lying in said first vertical plane of said center baffle plate means;

top baffle plate means disposed above the upper terminal end face of said tubular conduit means and lying in a generally horizontal plane, said top baffle plate means having a lower face intersecting the upper edge of said center baffle plate means, said top baffle plate means being spaced a distance above the upper terminal end face of said tubular conduit means by said center baffle plate means; and

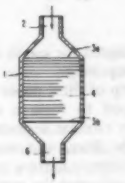
first and second vertical side wall means disposed respectively on opposite sides of said tubular conduit means, said first and second vertical side wall means lying in respective mutually parallel vertical planes each being normal to the generally horizontal plane of said top baffle plate means and normal to the first vertical plane of said center baffle plate means, said first and second vertical side wall means each having an upper edge intersecting the lower face of said top baffle plate means with the opposite side edges of said center baffle plate means intersecting said first and second vertical side wall means, and said first and second vertical side wall means each having a lower edge intersecting the bottom wall of said vessel.

4,696,742

ACTIVE CARBON FIBERS AND FILTER ADSORPTION UNIT FOR WATER PURIFICATION COMPRISING SAID FIBERS

Kenji Shimazaki, Shizuoka, Japan, assignor to Toho Beslon Co., Ltd., Tokyo, Japan

Division of Ser. No. 682,955, Dec. 18, 1984, Pat. No. 4,576,929. This application Jan. 6, 1986, Ser. No. 799,056
Claims priority, application Japan, Dec. 22, 1983, 58-240874
Int. Cl.[4] B01D *15/00*
U.S. Cl. 210—287 **7 Claims**



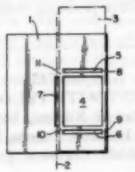
1. A filter adsorption unit for water purification, comprising a vessel having an inlet for water to be treated, a packing space for active carbon fibers and an outlet for treating water, said packing space further containing at least first active carbon fibers being derived from acrylic fibers and having a BET specific surface area (SA_1) of from 800 to 2,000 m^2/g, a ratio (S_1) of pore volume (Vp_1) to BET specific surface area (SA_1) of from 5×10^{-4} to 14.5×10^{-4}, and a methylene blue adsorption rate constant (MB_1) of not less than 5×10^{-1} sec^{-1}.

4,696,743

CENTRIFUGATION

Alan J. Gordon, Liverpool, and Donald G. Billington, Stoke on Trent, both of England, assignors to Shandon Southern Products Limited, Runcorn, England

Filed Jun. 5, 1986, Ser. No. 871,061
Int. Cl.[4] B01D *33/22*
U.S. Cl. 210—361 **10 Claims**



1. In centrifugation apparatus including a sample chamber, a deposit-receiving surface and a filter card apertured to define on that surface a solids deposition area communicating with said sample chamber, the improvement that comprises said filter card having liquid flow paths from the perimeter of its said aperture of selectively restricted cross-sectional area for

engendering substantially constant velocity flow of liquid from the sample chamber substantially normal to all points on the periphery of said aperture sufficient for promoting substantially uniform deposition of said solids on said surface throughout said deposition area to facilitate inspection of said deposition.

4,696,744

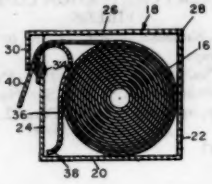
COFFEE FILTERS AND DISPENSER CONTAINER THEREFOR

Raymond Sedlacek, P.O. Box 41, Flagler Beach, Fla. 32036

Filed Jan. 27, 1986, Ser. No. 822,819

Int. Cl.[4] B01D *27/06, 27/08*

U.S. Cl. 210—387 **1 Claim**



1. Coffee filters adapted for use in coffee making machines requiring a filter, comprising:

a. a continuous strip of filter paper in the form of an elongated tape shaped to form a series of longitudinally spaced, generally circular segments each configurated to serve as a single filter, said segments being severably connected by relatively narrow connecting strips of filter paper left intact adjacent the center line of the tape, said tape being longitudinally rolled whereby to permit the storage of a large number of said segments in a very small space, said tape being extendable from said roll to enable separation of said segments therefrom one at a time,

b. a dispenser container for said roll of filter paper tape, said roll being carried in said container for axial rotation therein, said container having a narrow exit opening through which tap led from said roll exits said container, said container also having a cutting edge against which the connecting strips between the segments of said tape may be severed, and,

c. a filler member comprising a thin sheet of resiliently flexible material mounted in said container, the plane of said sheet extending the full length of said paper roll and being parallel with but spaced from said roll, and having a cross-section contour including a smoothly curved portion bounding said exit opening and extending away from said opening toward the interior of said container, over the convex side of which paper leaving said roll must pass, and an extension projecting interiorly into said container and operable by its resilience to engage and press said roll against an opposite wall of said container, whereby to apply a braking force resisting rotation of said roll within said container.

4,696,745

SEPARATING AGENT WITH FLUOROALKYL GROUP

Takaharu Itagaki; Hiroshi Kusano, both of Yokohama; Eiji Miyata, Tokyo, and Hirohisa Kubota, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

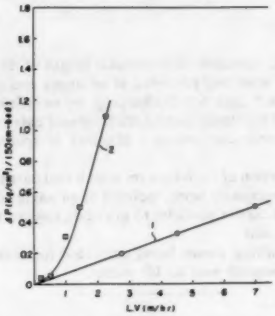
Filed Apr. 9, 1986, Ser. No. 849,764

Claims priority, application Japan, Apr. 9, 1985, 60-74705; Jun. 10, 1985, 60-125642

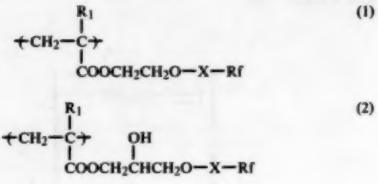
Int. Cl.[4] B01D *15/08;* **C08J** *9/36*

U.S. Cl. 210—502.1 **10 Claims**

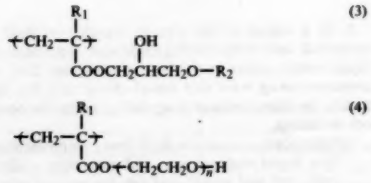
1. A separating agent, consisting essentially of porous particles of a cross-linked copolymer having a porosity in a range of from 0.5 to 3 ml/g and an average particle diameter in a range of from 1 to 2,000 μm, said copolymer being composed essentially of a cross-linking component consisting of alkylene di(meth)acrylate and/or glycerine poly(meth)acrylate; an ester



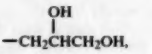
component containing a fluorine compound represented by the following general formulae (1) and/or (2); and a glycerine-derived ester component and/or a polyethylene glycol ester component represented by the following general formulae (3) and/or (4):



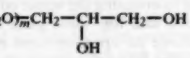
(in the above general formulae (1) and (2), R_1 denotes hydrogen or a methyl group; X represents a methylene group or a carbonyl group; and Rf designates a fluoroalkyl group in a straight chain or branched chain form, and having less than 10 carbon atoms)



(in the above general formulae (3) and (4), R_1 denotes hydrogen or a methyl group; R_2 represents $—CH_2CH_2)_lH$ (l is an integer of from 0 to 10), $—CH_2C(CH_2OH)_3$,



—Glu (Glu is a residual group of glucose), —(CD designates a residual group of cyclodextrin), or

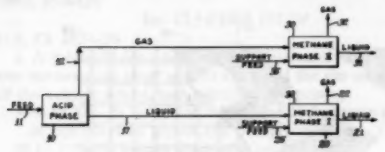


(m is an integer of 0 or 1); and n is an integer of from 1 to 4).

4,696,746
TWO PHASE ANAEROBIC DIGESTION

Sambhunath Ghosh, Homewood; David P. Chynoweth, St. Charles, and Paul B. Tarman, Elmhurst, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Oct. 30, 1984, Ser. No. 666,332
Int. Cl.[4] C02F *11/04*
U.S. Cl. 210—603 20 Claims



1. A process for improved methane production by two phase anaerobic digestion of organic carbonaceous material comprising the steps:

introducing said organic carbonaceous material into an acid phase digester at a rate of about 0.2 to about 10 pounds total organics per cubic foot per day;

maintaining an active acid forming microbial population in said acid phase digester and fermenting said organic carbonaceous material under mesophilic or thermophilic anaerobic conditions and a pH about 4 to about 8 for a detention time of about 1 hour to about 5 days;

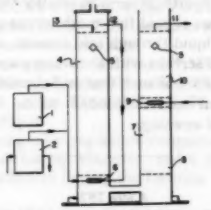
passing liquid/solids effluent from said acid phase digester to a methane phase I digester and passing gaseous product of said acid phase digester only to a separate methane phase II digester operated in parallel with said methane phase I digester; and

maintaining an active methane forming microbial population in each of said methane phase I and said methane phase II digesters and withdrawing gas comprising methane from each said methane phase I and methane phase II digesters.

4,696,747
PROCESS FOR THE ELIMINATION OF NITRATES BY MEANS OF A MICROBIOLOGICAL CONVERSION IN THE PRESENCE OF HYDROGEN GAS

Willy Verstraete, Wondelgem, and Jozef De Ley, Deurle, both of Belgium, assignors to Ateliers de Constructions Electriques de Charleroi (ACEC) Societe Anonyme, Brussels, Belgium

Filed Feb. 25, 1986, Ser. No. 832,758
Claims priority, application European Pat. Off., Feb. 25, 1985, 852002492
Int. Cl.[4] C02F *3/30*
U.S. Cl. 210—605 19 Claims

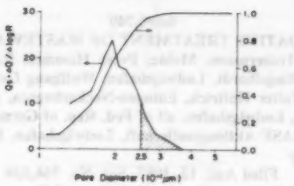


1. A microbiological denitrification process consisting essentially of the steps of (a) directing an aqueous stream comprising at least one nitrate into contact with a first denitrifying biomass contained in a cell, said denitrifying biomass having an affinity for hydrogen and also being contacted by hydrogen gas introduced as a gas into said cell, wherein a portion of said hydrogen gas is recycled for use in subsequent denitrification via said process; (b) directing said aqueous stream into contact with a second denitrifying biomass, such that hdyrogen introduced into said stream during step (a) is consumed and then (c) directing said aqueous stream into contact with a nitrifying biomass which is also contacted with a fluid containing oxygen or at least one constituent which, upon contact with said aqueous stream, releases oxygen, such that all nitrogenous components in said aqueous stream are converted to nitrate to produce potable water.

4,696,748
PLASMA SEPARATOR AND A PROCESS FOR PREPARING THE SAME

Yoshiaki Nitadori, Oita, and Toru Nakano, Nobeoka, both of Japan, assignors to Asahi Medical Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 788,125
Claims priority, application Japan, Oct. 16, 1984, 59-215201; Oct. 16, 1984, 59-215202; Nov. 1, 1984, 59-229001
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—636 9 Claims



1. A plasma separator comprising:

a vessel provided with a blood introduction means, a blood withdrawal means and a plasma withdrawal means; and

a plurality of porous hollow fibers which are contained within the vessel, leaving spaces between the inner surface of said vessel and said plurality of porous hollow fibers and between and inside said plurality of porous hollow fibers;

said blood introduction means and said blood withdrawal means communicating with each other through said plurality of porous hollow fibers fluid tightly connected therebetween;

said hollow fibers being adapted to pass blood therethrough while causing the plasma component of the blood to be selectively passed through the walls of the hollow fibers and withdrawn through the plasma withdrawal means;

each hollow fiber being made of a polyolefin oriented in the lengthwise direction of the hollow fiber and having elliptic pores defined by microfibrils that are oriented in the lengthwise direction of the hollow fiber and knotted portions that are cross-connected to said microfibrils and are each in the form of stacked lamellae, said pores including intermediate pores which are present within the wall of the porous hollow fiber in communicating relationship and end pores which open at the inner and outer wall surfaces of the hollow fiber and forming throughpaths running from the inner wall surface of the porous hollow fiber to the outer wall surface of the porous hollow fiber;

each end pore which opens at the inner wall surface of the hollow fiber having:

an average nominal major axis (dl) of from 0.3 to 3.0 μm, and an average nominal minor axis (d_s) of from 0.1 to 0.5 μm;

each hollow fiber having:

a fraction of pores having a diameter of 0.25 μm or more, relative to the whole pores, of 15% or more, as measured from a pore diameter distribution curve obtained in accordance with the wet membrane gas permeation method,

a water permeability of from 5 to 20 l/hr.m^2.mmHg,

a permeability for colloidal silica, which has an average particle diameter of 0.08 μm, of 70% or more, and a per-

meability for polymer latex, which has an average particle diameter of 0.2 μm, of from 10% to 80%, and

a limiting pore diameter (D_L), as measured in accordance with the standard particle permeation method, satisfying an inequality:

$$D_L/d_s \geq 0.9$$

wherein d_s is as defined above;

said spaces and said pores being filled with a sterile water or sterile solution substantially not containing any non-physiological organic compound;

and which separator has been sterilized with a sterilizing gas before said spaces and said pores are filled with the sterile water or sterile solution and is aseptically isolated from the environment after said spaces and said pores are filled with the sterile water or sterile solution.

4,696,749

OXIDATIVE TREATMENT OF WASTEWATERS

Wolfgang Habermann, Mainz; Peter Hammes, Ruppertsberg; Hubert Engelhardt, Ludwigshafen; Wolfgang Geiger, Plankstadt; Walter Haltrich, Edingen-Neckarhausen, and Werner Simmler, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 12, 1985, Ser. No. 764,326

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430484

Int. Cl.[4] C02F *1/72*

U.S. Cl. 210—721 **16 Claims**

1. A process for the oxidative treatment of a wastewater whereby said wastewater is passed through filter beds containing a carbon-containing catalyst and an oxidizing agent, wherein the carbon-containing catalyst is formed by subjecting a carbon carrier to anodic oxidation in an aqueous mineral acid at a potential ϵ_h of from about +1.3 to +10 V and then doped with one or more compounds selected from the group consisting of molybdenum-(VI), tungsten (VI) and vanadium.

4,696,750

FLOCCULATION OF PARTICLES BY POLYMERS THAT PRECIPITATE OUT OF SOLUTION

Jay Donald, Summit, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 23, 1985, Ser. No. 812,517

Int. Cl.[4] B01D *21/00*

U.S. Cl. 210—727 **4 Claims**

1. A process for flocculating solid fines selected from the group consisting of coke fines, catalyst fines, synthetic fuel fines, coal fines, and shale fines from a solution comprising said solid fines and an organic liquid which comprises the steps of:

(a) adding with mixing about 100 to about 500 ppm of a water insoluble unneutralized or neutralized sulfonated polystyrene to said solution of solid fines, wherein said sulfonated polystyrene is dissolved in a dissolving organic liquid at a concentration level of about 0.01 to about 20 weight percent and has from about 5 to about 200 meg. pendant sulfonate groups per 100 grams of polymer, and wherein said sulfonated polystyrene is absorbed on the surface of said solid fines; and

(b) adding with mixing about 5 to about 25 weight percent of an antisolvent to the mixture of the sulfonated polystyrene and said solution of said solid fines wherein said antisolvent is an aliphatic hydrocarbon having about 7 to 30 carbon atoms, and wherein said solid fines collide to form agglomerates which precipitate out of said solution.

4,696,751

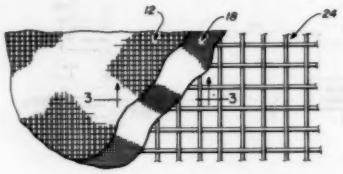
VIBRATORY SCREENING APPARATUS AND METHOD FOR REMOVING SUSPENDED SOLIDS FROM LIQUID

Dennis R. Eifling, Katy, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 4, 1986, Ser. No. 892,644

Int. Cl.[4] B01D *39/10*; B07B *1/40*

U.S. Cl. 210—780 **14 Claims**



1. A vibratory screening apparatus to effectively prevent suspended solids from becoming lodged therein during removal of suspended solids from a liquid comprising:

a. a first upper mesh screen having openings with first and second different dimensions for receiving said suspended solids thereon,

b. a second lower mesh screen in superimposed abutting relationship with said first screen and having openings with a third and fourth dimension perpendicular to the dimensions of said first screen openings, said third dimension being larger than the smaller of said dimensions of said first mesh screen openings and said fourth dimension being smaller than the larger of said dimensions of said first mesh screen openings, and

c. vibratory means coupled to said abutting screens for vibrating said screens whereby said abutting screens effectively prevent suspended solids from becoming lodged in said upper and lower mesh screen openings.

8. A method of effectively preventing suspended solids from becoming lodged in a vibrating screening apparatus during removal of said suspended solids from a liquid comprising the steps of:

a. forming a first upper mesh screen having openings with first and second different dimensions for receiving said suspended solids thereon,

b. placing a second lower mesh screen in superimposed abutting relationship with said first screen, said second screen having openings with a third and fourth dimension perpendicular to the dimensions of said first screen openings and having said third dimension larger than the smaller of said dimensions of said first mesh screen openings and said fourth dimension smaller than the larger of said dimensions of said first mesh screen openings,

c. passing said liquid through said screens, and

d. vibrating said screens with a vibratory source coupled to said abutting screens such that said abutting screens effectively prevent said suspended solids from becoming lodged in said openings.

4,696,752

SYSTEM FOR ACIDIZING OIL AND GAS WELLS

Michael C. Lysandrou, Houston, and Clarence L. Dulaney, Missouri City, both of Tex., assignors to Standard Oil Company, Chicago, Ill.

Filed Sep. 28, 1982, Ser. No. 425,386

Int. Cl.[4] E21B *43/27, 43/12*

U.S. Cl. 252—8.553 **1 Claim**

1. A composition for use in acidizing oil and gas wells, which composition comprises about 25 wt % methanol, about 11.6 wt % 2-octanol, and about 63.4 wt % isopropyl alcohol.

4,696,753

LUBRICANT FOR A TIRE AND WHEEL ASSEMBLY

Henning Umland, Winsen/Luhe, and Gerhard Fricke, Bad Münder, both of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jul. 17, 1986, Ser. No. 887,818
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526428
Int. Cl.[4] C10M *103/04*
U.S. Cl. 252—26 6 Claims

1. A lubricant for a tire and wheel assembly to reduce friction between the inner wall of a tire and the rim or other parts of the vehicle wheel, said lubricant comprising:

50% to 70% by weight of at least one of the group consisting of polyethylene glycol and polyglycol ether;

49 to 27% by weight aluminum bronze; and

1 to 3% by weight of a wetting agent.

4,696,754

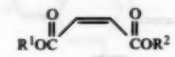
LUBRICANT-STABILIZER COMPOSITIONS FOR HALOGEN-CONTAINING ORGANIC POLYMERS AND POLYMER COMPOSITIONS THEREOF

Gary M. Conroy, and Karl R. Wursthorn, both of Cincinnati, Ohio, assignors to Morton Thiokol, Inc., Chicago, Ill.

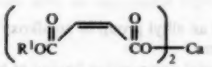
Filed Aug. 11, 1986, Ser. No. 895,183
Int. Cl.[4] C10M *129/30*
U.S. Cl. 252—40.5 25 Claims

1. A lubricating-stabilizing composition for halogen-containing organic polymers comprising:

(a) from about 50 to about 85% by weight of a dihydrocarbyl ester of maleic acid of the formula:



(b) from about 15 to about 50% by weight of a calcium salt of a monohydrocarbyl ester of maleic acid of the formula:



wherein R^1 and R^2 are each selected from the group consisting of alkyl and alkenyl radicals having at least 8 carbon atoms.

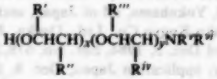
4,696,755

LUBRICATING OIL COMPOSITIONS CONTAINING HYDROXY POLYETHER POLYAMINES

Curtis B. Campbell, Rodeo, Calif., assignor to Chevron Research Company, San Francisco, Calif.

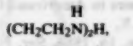
Continuation-in-part of Ser. No. 547,558, Oct. 31, 1983, abandoned. This application Dec. 28, 1984, Ser. No. 687,046
Int. Cl.[4] C10M *119/24*
U.S. Cl. 252—515 R 6 Claims

1. A lubricating oil composition comprising a major portion of an oil of lubricating viscosity, and a dispersant effective amount of an additive having the formula:



wherein:

R′ and R″ independently are selected from the group consisting of hydrogen and alkyl groups having from 1 to 4 carbon atoms, and where at least one of R′ and R″ has at least 2 carbon atoms; R‴ and R^{iv} are independently hydrogen or methyl; R^v and R^{vi} independently are hydrogen or



where z is an integer from 1 to 5; x and y independently are integers from 1 to 30; and wherein

contains more carbon atoms than

4,696,756

ORGANOPOLYSILOXANE COMPOSITION FOR VISCOUS FLUID COUPLING

Makoto Yoshitake, and Keiichi Kishimoto, both of Tokyo, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan

Filed Oct. 9, 1986, Ser. No. 917,330
Claims priority, application Japan, Nov. 8, 1985, 60-250378
Int. Cl.[4] C10M *107/50*
U.S. Cl. 252—78.3 14 Claims

8. An organopolysiloxane composition comprising:

(i) a liquid organopolysiloxane having the average unit formula

wherein R is a monovalent hydrocarbon radical and a is 1.7 to 2.3: and

(ii) a reaction product of (A) an organopolysiloxane having the average unit formula

wherein R^1 is a monovalent hydrocarbon group and b is 1.4 to 2.3 with (B) from 0.01 to 10 parts by weight of an aromatic aminophenol per 100 parts of said organopolysiloxane (A), in the presence of (C) from 0.001 to 1.0 part by weight of a quaternary phosphonium hydroxide per 100 parts of said organopolysiloxane (A) and in the presence of (D) from 0 to 20 parts by weight of an organopolysiloxane cyclic having the general formula

per 100 parts of said organopolysiloxane (A), wherein R is a monovalent hydrocarbon group and n in an integer having a value of 3 to 6.

4,696,757

STABLE HYDROGEN PEROXIDE GELS

Robert G. Blank, Vineland, and Dhiraj S. Mody, Hammonton, both of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,739
Int. Cl.[4] C08K 5/14; C08L 71/02
U.S. Cl. 252—186.29 2 Claims

1. A gel stable at temperatures below about 50° F. comprising, based on a total of 100 parts by weight,

(a) from about 5 parts to about 20 parts of hydrogen peroxide,

(b) from about 20 parts to about 60 parts of water, and

(c) from about 18 parts to about 30 parts of a co-polymer of the formula

$$HO(C_2H_4O)_a(C_3H_6O)_b(C_2H_4O)_bH$$

wherein a is an integer such that the hydrophobe base represented by (C_3H_6O) has an average molecular weight of from 2750 to 4000 and b is an integer such that the hydrophile portion represented by (C_2H_4O) constitutes from about 45 to 80 weight percent of the copolymer, and

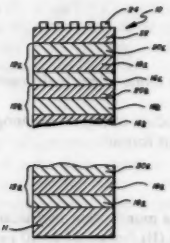
(d) at least 30 parts of glycerine.

4,696,758

GAS MIXTURES FOR THE VAPOR DEPOSITION OF SEMICONDUCTOR MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills; Subhendu Guha, Clawson; Prem Nath, Rochester; Chi Chung Yang, Troy; Jeffrey Fournier, St. Clair Shores, and James Kulman, Detroit, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation of Ser. No. 718,661, Apr. 1, 1985, Pat. No. 4,637,895. This application Oct. 6, 1986, Ser. No. 897,236
The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.
Int. Cl.[4] C09K 11/07
U.S. Cl. 252—188.31 9 Claims



1. A gaseous precursor mixture from which semiconductor alloy material may be deposited by glow discharge decomposition:

said mixture including a polysilane compound and a germanium-containing compound, said compounds capable of decomposing and depositing at substantially similar rates when subjected to electromagnetic energy; and said polysilane compound having the general formula $Si_xR_yH_z$, where R is chosen from the group consisting essentially of hydrogen, fluorine, chlorine, iodine, bromine and combinations thereof, x is an integer greater than one, y and z are each an integer or zero, and $y+z=2x+2$.

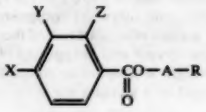
4,696,759

ESTER COMPOUND

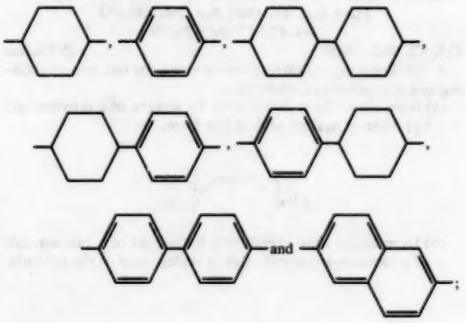
Toyoshiro Isoyama; Yasuyuki Goto; Tetsuya Ogawa, all of Yokohamashi, and Shigeru Sugimori, Fujisawashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed May 5, 1986, Ser. No. 859,801
Claims priority, application Japan, May 22, 1985, 60-109599; Aug. 15, 1985, 60-179708
Int. Cl.[4] C09K 19/30, 19/32, 19/12, 19/20; C07C 69/76
U.S. Cl. 252—299.62 6 Claims

1. An ester compound expressed by the formula



wherein X represents F; Y represents H, F or Cl; Z represents F or H, with the proviso that when Y is F or Cl, Z is H and when Z is F, Y is H; —A— represents a member selected from the group consisting of



and R represents an alkyl group or an alkoxy group each of 1 to 10 carbon atoms.

4. A liquid crystal composition having at least two components at least one of which is an ester compound as set forth in claim 1.

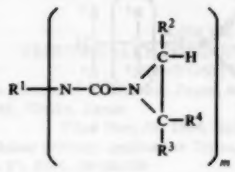
4,696,760

METHOD FOR PRODUCTION OF AQUEOUS DISPERSION OF N-SUBSTITUTED N',N'-ALKYLENE UREA

Yutaka Morimoto, Yokohama; Minoru Saotome, Ebina, and Atsushi Komai, Yokohama, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

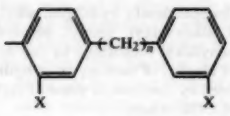
Filed Dec. 5, 1984, Ser. No. 678,247
Claims priority, application Japan, Dec. 8, 1983, 58-230613; Dec. 9, 1983, 58-231347
Int. Cl.[4] C09K 3/00; B01J 13/00; C07D 203/12
U.S. Cl. 252—314 16 Claims

1. A method for the production of an aqueous dispersion of a water insoluble N-substituted N',N'-alkylene urea having the general formula I:

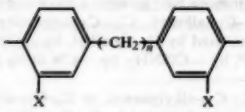


(I)

wherein R^1 denotes alkyl having 6 to 20 carbon atoms, phenyl or



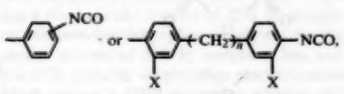
in case of m=1, or R^1 denotes alkylene having 6 to 20 carbon atoms, phenylene or



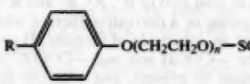
in case of m=2, where X denotes H, CH_3 or OCH_3 and n is 0 or 1, R^2 denotes H or CH_3, R^3 denotes H, CH_3 or C_2H_5 and R^4 denotes H or CH_3, by the reaction of an alkylene imine having 2 to 4 carbon atoms with an isocyanate represented by the general formula II:

(II)

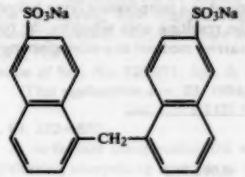
wherein R denotes an alkyl having 6 to 20 carbon atoms,



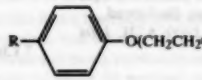
wherein X and n are the same as above in the presence of at least one surface active agent selected from the group consisting of (a) at least one anionic surface active agent selected from the group consisting of alkyl-sulfate type $R—OSO_3Na$, polyoxyethylene-alkyl ether sulfate type $R—O(CH_2CH_2O)_n-SO_3Na$, polyoxyethylene-alkylphenyl ether sulfate type



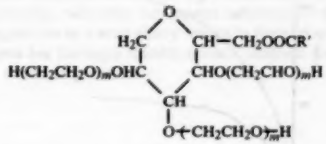
β-naphthalene sulfonic acid-formaldehyde polycondensate type



and (b) at least one nonionic surface active agent selected from the group consisting polyoxyethylene alkyl ether type $R—O(CH_2CH_2O)_nH$, polyoxyethylene alkylaryl ether type



olyoxyethylene carboxylic ester type $R—COO(CH_2CH_2O)_nH$ and polyoxyethylene sorbitan fatty ester type



(wherein R′ represents an alkyl having 6 to 25 carbon atoms and m an integer having the value of 5 to 50) at a temperature of not more than 25° C. under vigorous stirring or grinding.

4,696,761

DE-FOAMER AND PROCESSES FOR ITS PRODUCTION

Karlheinz Haubennestel, Wesel; Daniela Breil, Hamminkeln; Alfred Bubat, Wesel-Bislich, and Werner Spratte, Wesel-Flüren, all of Fed. Rep. of Germany, assignors to Byk-Chemie GmbH, Wesel, Fed. Rep. of Germany

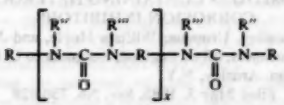
Continuation of Ser. No. 558,153, Dec. 5, 1983. This application May 2, 1986, Ser. No. 860,686

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1982, 3245482

Int. Cl.[4] B01D *17/04, 19/04*

U.S. Cl. 252—358 **8 Claims**

1. A de-foamer composition produced in situ in an organic carrier medium by a process comprising reacting mono- and-/or polyfunctional isocyanates with mono and/or polyfunctional amines at temperatures lying below the melting temperature of the resulting urea in said carrier medium, said organic carrier medium not being a true solvent for said urea, said de-foamer containing as an active component at least one urea of the formula:



wherein

R is C_4 to C_{30} alkyl;

R′ is C_2 to C_{12} alkylene, phenylene, or naphthylene with or without substitution by one or more C_1 to C_9 alkyl groups, or cycloalkylene;

R″ is H or CH_3;

R‴ is H or CH_3; and

x is 0 or 1,

said reaction being performed at a temperature lying below the melting temperature of the resulting urea whereby the resulting urea is formed in the carrier medium as a monodispersed or micellular structure.

4,696,762

HYDROXYPROPYLMETHYLCELLULOSE

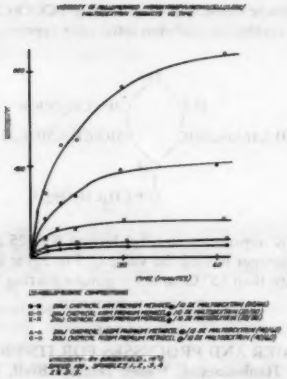
Eugene H. Sander, and Douglas R. Cook, both of Hayfield, Minn., assignors to Zumbro Enterprises, Inc., Hayfield, Minn.

Filed Dec. 6, 1985, Ser. No. 805,990

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[4] B01J *13/00*; A23L *1/04*

U.S. Cl. 252—311 **7 Claims**



1. A method of dispersing a hydroxypropylmethylcellulose (HPMC) in an aqueous solution, regardless of the temperature of the solution, the method comprising:

agglomerating HPMC in a gaseous air stream by intermittently spraying the particles with a liquid spray while the particles are in a fluidized state causing the surfaces of the particles to become tacky and the particles to stick to each other and permitting the particles to dry between spraying intervals and continuing spraying and drying of the particles until agglomerated particles are formed; and

dispersing the agglomerated particles in an aqueous solution.

4,696,763

COMPOSITIONS CONTAINING HETEROCYCLIC CORROSION INHIBITORS

Robert L. Bentley, Urmston; William Hoyle, and James Jack, both of Stockport, all of England, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

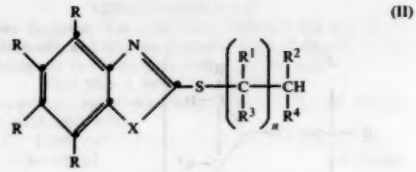
Filed May 3, 1985, Ser. No. 730,028

Claims priority, application United Kingdom, May 11, 1984, 8412063

Int. Cl.[4] C09K *15/30*

U.S. Cl. 252—391 **24 Claims**

1. A composition which comprises (A) an aqueous or non-aqueous coating composition suitable for preparing a surface coating which is a paint, and (B) an effective corrosion-inhibiting amount of a compound of formula II



(II)

in which

X is sulphur;

R is each independently of one another hydrogen, alkyl, haloalkyl, alkoxy, alkylthio, alkylsulfonyl, cycloalkyl, phenyl, alkylphenyl, phenylalkyl, halogen, cyano, nitro, hydroxy, —COOH, —COOalkyl or a primary-, secondary- or tertiary-amino or carbamoyl group;

n is 0 or 1;

R^1, R^2, R^3 and R^4 are independently hydrogen, alkyl, hydroxyalkyl, haloalkyl, alkoxyalkyl, phenyl, phenyalkyl, said phenyl or said phenylalkyl substituted by one or two of halogen, of alkyl, of alkoxy, of carboxy or of hydroxy; carboxy, alkyl substituted by one, two or three of carboxy or of —COOZ; or —COOZ where

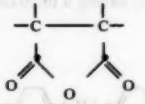
Z is C_1–C_{18}-alkyl, said alkyl interrupted by one or more O or S atoms or by one or more NR^o groups where R^o is C_1–C_{18}-alkyl, C_5–C_8-cycloalkyl, phenyl, napthyl, C_7–C_9-phenylalkyl or C_7–C_{18}-alkylphenyl; or said alkyl substituted by —SH, by —$COOR^o$, by —$CONH_2$, by —CN or by halogen; C_2–C_1-hydroxyalkyl or said hydroxyalkyl interrupted by one or more NR^o groups or by one or more oxygen atoms; C_2–C_{18}-alkenyl, C_3—C_{12}-cycloalkyl or said cycloalkyl substituted by C_1–C_4-alkyl, by —OH, by —SH, by —$COOR^o$, by —$CONH_2$, by —CN or by halogen;

C_7–C_9-phenylalkyl, C_7–C_{18}-alkylphenyl, or C_6–C_{10}-aryl or said phenyl or said aryl substituted by C_1–C_{12}-alkoxy, by C_1–C_{12}-alkylthio, by —COOH, by —OH, by halogen or by nitro; or

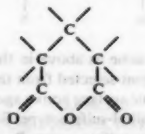
(B) is a compound of formula II where the moiety

$$\{-C(R^1)(R^3)\}_n-CH(R^2)(R^4)$$

contains a group of formula III or IIIa



(III)



(IIIa)

or where R^1 and R^2 or R^1 and R^3 together form a straight or branched alkylene, or said alkylene substituted by one or two —COOH or by one or two —COOZ; or where R^1 and R^2 form a direct bond;

with the proviso that at least two of R^1, R^2, R^3 and R^4 must contain a carboxy group or a derivative thereof which is a —COOZ group or an anhydride of formula III or IIIa, and that at least one —COOH and one —COOZ, or one anhydride group must be present, and with the further proviso that when n is 1 and R^1 or R^3 is —COOZ, then neither R^2 nor R^4 is —COOZ; or when n is 0, R^2 or R^4 is not —COOZ; or

(B) is a non-toxic base addition salt of a compound of formula II which contains a free carboxy group.

4,696,764

ELECTRICALLY CONDUCTIVE ADHESIVE COMPOSITION

Taro Yamazaki, Yokohama, Japan, assignor to Osaka Soda Co., Ltd., Osaka, Japan

Filed Nov. 30, 1984, Ser. No. 676,876

Claims priority, application Japan, Dec. 2, 1983, 58-227057; Sep. 17, 1984, 59-195139

Int. Cl.[4] H01B 1/04

U.S. Cl. 252—503 10 Claims

1. An electrically conductive adhesive composition which provides electric conductivity between facing electrodes but maintains electric insulation in the lateral direction across the facing direction, said composition comprising (a) a nonconductive base resin and (b) electrically conductive particles incorporated and dispersed in the resin (a); wherein

(I) said electrically conductive particles (b) are composed of

(b-1) 10 to 75%, based on the total weight of the components (a), (b-1) and (b-2), of abrasive grain-like electrically conductive particles having an average particle diameter of at least 1 micrometer, and

(b-2) 0.2 to 20% by weight, based on the total weight of the components (a), (b-1) and (b-2), of electrically conductive fine particles having an average particle diameter of not more than 0.5 micrometer, and

(II) said electrically conductive adhesive composition contains a solvent for said base resin (a) in an amount required to form said composition into the state of a printing ink or a paint.

4,696,765

SEMICONDUCTIVE RESIN COMPOSITION

Tetsuji Kakizaki; Toshikazu Mizutani, and Hiroshi Yui, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 18, 1984, Ser. No. 663,593

Claims priority, application Japan, Oct. 27, 1983, 58-201347

Int. Cl.[4] H01B 1/06

U.S. Cl. 252—511 15 Claims

1. A semiconductive resin composition comprising:

(A) 100 parts by weight of a base resin of at least one member selected from the group consisting of a low-density polyethylene, an ethylene/vinyl acetate copolymer having a vinyl acetate content of 25% by weight or less and an ethylene/(meth)acrylate copolymer having a (meth)acrylate content of 20% by weight or less, and

(B) 6 to 25 parts by weight of an electroconductive carbon black having a DBP-absorption number of 220 to 340 ml/100 g and an impurity metal residue of 0.2% by weight or less.

4,696,766

(2R*,3S*)-(E)-3-METHYL-5-(2,2,3-TRIMETHYLCYCLOPENT-3-EN-1-YL)PENT-4-EN-2-OL

Richard E. Naipawer, Wallington, N.J., assignor to Givaudan Corporation, Clifton, N.J.

Filed Mar. 19, 1986, Ser. No. 841,500

Int. Cl.[4] A61K 7/46; C11B 9/00; C07C 35/06

U.S. Cl. 512—8 27 Claims

1. A mixture of isomers of 3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pent-4en-2-ol comprising at least ten percent (2R*,3S*)-(E)-3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pent-4-en-2-ol.

4,696,767

SURFACTANT COMPOSITIONS

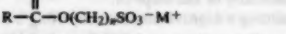
Mario Novakovic, Kew Garden Hills, N.Y., and Phillip G. Abend, Fairlawn, N.J., assignors to Finetex, Inc., Elmwood Park, N.J.

Division of Ser. No. 720,071, Apr. 3, 1985, Pat. No. 4,612,136. This application Jun. 23, 1986, Ser. No. 877,134

Int. Cl.[4] C11D 1/22

U.S. Cl. 252—557 6 Claims

1. A surfactant composition for subsequent addition to a soap slurring comprising an acyloxy alkane sulfonate salt having the formula:



Wherein R is a hydrocarbyl radical, n is an integer of from 2 to 4 inclusive, and M is an alkali metal, a polyol and water, said sulfonate salt being present in an amount by weight of about 44 percent ot about 56 percent, said polyol being present in an amount by weight of about 2 percent to about 6 percent, and water being present in an amount by weight of 26 to 36 percent, said composition constituting a solid reversible solution at ambient temperature and having a solids content of about 58 to 72 percent, whereby subsequent addition of the surfactant composition to a soap slurry results in formation of a soap/detergent bar having a smooth texture, uniform wear properties and a lack of grittiness.

4,696,768

PROCESS FOR THE SEPARATION OF LARGE AMOUNTS OF URANIUM FROM SMALL AMOUNTS OF RADIOACTIVE FISSION PRODUCTS, WHICH ARE PRESENT IN BASIC, AQUEOUS CARBONATE CONTAINING SOLUTIONS

Sameh A. H. Ali, Ettlingen, and Juergen Haag, Worms, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany

Filed Aug. 5, 1985, Ser. No. 762,364

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1984, 3428877

Int. Cl.[4] C01G 43/00; C22B 60/02; C09K 3/00

U.S. Cl. 252—628 10 Claims

1. Process for separating large amounts of uranium from small amounts of radioactive fission products, which are present in basic, aqueous carbonate containing solutions in which the uranium is present in the form of uranyl-carbonato complex, by means of a basic, organic anion exchanger, comprising:

(a) adjusting the aqueous solution to a molar ratio of uranyl ion concentration to carbonate ion-concentration or CO_3^{--}/HCO_3^- concentration of $1(UO_2^{++})$ to at least 4.5 (CO_3^{--}, or CO_3^{--}/HCO_3^-), at a maximum U concentration of not more than 60 g/l,

(b) leading the adjusted solution over a basic anion exchanger comprising a polyalkene matrix provided with a preponderant part tertiary and a minor part quaternary amino groups to adsorb fission product ions or fission products containing ions, and

(c) recovering the unadsorbed uranyl-carbonato complex, decontaminated and preponderantly fission product free, by separating the uranium containing, remaining aqueous solution from the ion exchanger.

4,696,769

METHOD AND BINDER FOR THE MANUFACTURE OF NUCLEAR FUEL PELLETS, AND THE PRODUCT

Richard I. Larson, Wilmington; Richard P. Ringle, Scotts Hill; John D. Connolly, Jr., and Timothy J. Gallivan, both of Wilmington, all of N.C., assignors to General Electric Company, San Jose, Calif.

Continuation of Ser. No. 517,588, Jul. 27, 1983, abandoned. This application Jun. 17, 1985, Ser. No. 744,962

Int. Cl.[4] G21C *21/00*; C09K *11/04*; C07F *5/00*

U.S. Cl. 252—638 21 Claims

18. A method of producing coherent compacts of particulate ceramic nuclear fuel which imparts enduring plasticity to the particulate ceramic material for extended processing, consisting essentially of the steps of:

(a) adding a fugitive binder comprising a uranyl oxalate-carbonate reaction product of a combination of an amine compound in solution selected from the group consisting of carbonate or carbamate of ethylenediamine; monomethylene; 3,3 diaminodipropylamine; 1,3 diaminopropane; 1,6 diaminohexane; n butyl amine; diethylenetriamine; and 1,7 diaminoheptane and ammonium oxalate interacted at a temperature of at least about 65° C. and with uranium dioxide and having the composition of $(UO_2(CO_3)(C_2O_4).2H_2O).2H_2O$ to particulate nuclear fuel material containing uranium dioxide, and blending the resulting binder reaction product therethrough; and

(b) pressing the resultant blend comprising particulate fuel material and binder into a coherent compact.

4,696,770

METHOD FOR THE SYNTHESIS OF SULFONATED RUBRENE

David L. Dauplaise, Norwalk, and William J. Trzaskos, Ridgefield, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 7, 1984, Ser. No. 607,843

Int. Cl.[4] C09K *11/06*

U.S. Cl. 252—700 4 Claims

1. A process for the production of a sulfonated rubrene which comprises slowly charging an aqueous solution of fuming sulfuric acid to a solution of a rubrene in a solvent mixture of dioxane, and at least one of ethylene dichloride and methylene dichloride, reacting the acid and rubrene for at least about 12 hours, and recovering the resultant sulfonate rubrene.

4,696,771

AMINOPOLYOLS AND POLYURETHANES PREPARED THEREFROM

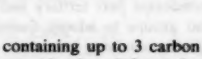
Don E. Floyd, Minneapolis, Minn., assignor to Henkel Corporation, Ambler, Pa.

Filed Dec. 3, 1985, Ser. No. 805,073

Int. Cl.[4] C11C *3/00*; C07C *93/04*

U.S. Cl. 260—404 4 Claims

1. An aminopolyol obtained by reacting an N-substituted alkanolamine of the general formula



where R is an alkyl group containing up to 3 carbon atoms with a terminal epoxy compound selected from the group consisting of a glycidyl ether of a fatty alcohol having 12–14 carbon atoms and a glycidyl ester of a branched chain fatty acid having 9–11 carbon atoms.

4,696,772

AMINE OXIDATION USING CARBON CATALYST HAVING OXIDES REMOVED FROM SURFACE

Shine K. Chou, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 705,391, Feb. 28, 1985, which is a continuation-in-part of Ser. No. 608,831, May 10, 1984, abandoned. This application Apr. 14, 1986, Ser. No. 851,764

Int. Cl.[4] C07F *9/38*; C07C *101/20*

U.S. Cl. 260—502.5 F 4 Claims

1. In a process for the selective production of secondary amines and primary amines by bringing together under reaction conditions a tertiary amine or a secondary amine with oxygen or an oxygen-containing gas in the presence of an activated carbon catalyst, the improvement which comprises using an activated carbon catalyst wherein carbon functional groups containing oxygen and hetero atom functional groups containing oxygen have been removed from the surface thereof.

4,696,773

PROCESS FOR THE PREPARATION OF ISETHIONIC ACID

Elvin R. Lukenbach, Somerset; Prakash Naik-Satam, East Windsor, both of N.J., and Anthony M. Schwartz, Rockville, Md., assignors to Johnson & Johnson Baby Products Company, New Brunswick, N.J.

Filed Jul. 7, 1986, Ser. No. 882,660

Int. Cl.[4] C07C *143/02*

U.S. Cl. 260—513 R 3 Claims

1. A process for the preparation of isethionic acid under anhydrous conditions comprising contacting anhydrous sodium isethionate with anhydrous hydrogen chloride in the presence of an alcohol solvent.

4,696,774

DECOLORIZING ARYLSULFONYL HALIDES

Jeffrey E. Telschow, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 24, 1986, Ser. No. 843,408

Int. Cl.[4] C07C *143/00*

U.S. Cl. 260—543 R 35 Claims

1. A process for decolorizing an halide prepared from the reaction of an arylsulfonic acid with a sulfur halide and the corresponding halogen comprising contacting the arylsulfonyl halide with a decolorizing agent selected from the group consisting of an oxidizing agent, a reducing agent, and a compound having at least one alkene linkage, said compound selected from the group consisting of a polybutadiene, a C_{14} to C_{30} alpha-olefin, and an unsaturated vegetable oil.

4,696,775

DEVICE FOR PRODUCING A GAS-AND-LIQUID MIXTURE

Peggy F. M. David, De Bilt, Netherlands, assignor to Kartell SpA, Italy

Filed Aug. 1, 1986, Ser. No. 891,615

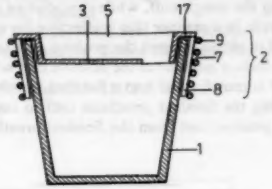
Claims priority, application Netherlands, Sep. 2, 1985, 8502391

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—1 19 Claims

1. Device for producing a gas-and-liquid mixture, such as for intake by humans, comprising a supply member for the liquid and a feeding arrangement for the gas, characterized in that the supply member for the liquid consists of a holder that is furnished with an element adapted to cooperate with a user's upper lip to comprise a liquid feed valve, which in part blocks the free discharge opening of the holder and can serve at the same time as a supporting surface for the upper lip, in such a way that the upper lip can occlude at most a part of the liquid

supply and the supporting surface for the lower lip at the same time constitutes the feeding arrangement for the gas, and is so



designed that the lower lip can occlude at most a part of the gas feed.

4,696,776

METHOD OF PRODUCING POLYURETHANE FOAMS FOR LOW STRESS ENCAPSULATION

James R. Hooker, and Robert M. Foss, both of Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 21, 1986, Ser. No. 887,596
Int. Cl.[4] B29C *67/00*
U.S. Cl. 264—46.4 **3 Claims**

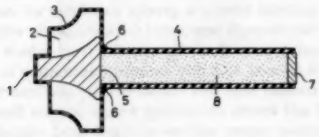
1. A method of encapsulating electronic components and the like comprising the steps of:
   - selecting an uncured liquid thermosetting polyurethane formulation;
   - selecting one or more of the group consisting of elastomeric, rigid and semi-rigid finely ground particulate foams to act as a nucleating agent;
   - adding said particulate foam by weight to said liquid polyurethane formulation;
   - mixing said particulate foam and said liquid polyurethane formulation into a substantially homogeneous mixture;
   - applying said homogeneous mixture of said particulate foam and said liquid polyurethane formulation to one of a form, casting, and the like containing electronic components to be encapsulated; and
   - curing said homogeneous mixture encapsulating electronic components for a pre-determined period of time at a predetermined temperature relative to the polyurethane formulation used.

4,696,777

COMPOSITE CERAMIC STRUCTURE AND METHOD FOR MANUFACTURING THE SAME

Shigenori Ito, Kasugai, Japan, assignor to NGK Insulators, Ltd., Japan

Filed Sep. 30, 1985, Ser. No. 781,713
Claims priority, application Japan, Oct. 4, 1984, 59-208962
Int. Cl.[4] C04B *33/32, 37/00*
U.S. Cl. 264—60 **5 Claims**



1. A method of producing a composite ceramic structure, comprising the steps of:
   - preparing a formed ceramic piece which constitutes a first portion of said composite ceramic structure; preparing a rubber mold having a molding surface defining a remaining portion of said composite ceramic structure; positioning said rubber mold in contact with a joining part of said formed ceramic piece from which said remaining portion of the composite ceramic structure extends; covering an entire exposed surface of said formed ceramic piece, and at least an end of said rubber mold adjacent to said joining part of the formed ceramic piece, with an elastic member; filling said rubber mold with a mass of ceramic powder such that the mass of ceramic powder contacts said joining part of said formed ceramic piece, said mass of ceramic powder being substantially identical with a ceramic material of which said formed ceramic piece is formed; applying a static hydraulic pressure to an assembly of said formed ceramic piece and said mass of ceramic powder in said rubber mold, thereby compacting said ceramic powder in said rubber mold and integrating the compacted mass of ceramic powder with said formed ceramic piece into an integral piece; and firing said integral piece to form said composite ceramic structure.

4,696,778

PROCESS FOR SINTERING SILICON NITRIDE ARTICLES

Jeffrey T. Neil, Pepperell, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jan. 31, 1986, Ser. No. 824,754
Int. Cl.[4] C04B *35/64*
U.S. Cl. 264—65 **6 Claims**

1. A process for sintering a silicon nitride article to a density greater than 98% of theoretical comprising the following steps:
   - (1) heating in a protective atmosphere under a pressure a silicon nitride article containing sintering aids having a liquidus temperature in a covered container to a temperature equal to or greater than the liquidus temperature of the sintering aids contained in said silicon nitride article;
   - (2) sintering the silicon nitride article from step (1) at the temperature obtained from step (1) for a period sufficient to obtain a density equal to or greater than 98% of theoretical density in said protective atmosphere at said pressure to form a sintered silicon nitride article;
   - (3) changing said pressure of step (2) sufficiently to displace greater than one quarter by volume of said protective atmosphere in said covered container, said changing of said pressure of step (2) having a minimum pressure, said minimum pressure during said changing of said pressure being sufficient to minimize weight loss of said silicon nitride article during said period of said sintering in step (2); and
   - (4) cooling the product from step (3) to room temperature and reducing the pressure of step (3) to atmospheric.

4,696,779

METHOD AND APPARATUS FOR FORMING AN ISOTROPIC SELF-ADHERING ELASTOMERIC RIBBON

Ronald H. Wideman, Winnebago County, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 17, 1986, Ser. No. 840,263
Int. Cl.[4] B29C *47/34*
U.S. Cl. 264—211.13 **12 Claims**

1. Apparatus for providing uniform gradient cooling simultaneously on all sides of an extrudable material to maintain the physical properties uniformly throughout the material, comprising:
   - means for extruding the material,
   - foraminous means for conveying the extruded material,
   - bisurfacially cooling means for directing a cooling medium simultaneously against the sides of the extruded material, and
   - temperature-gradient control means operatively connected to said bisurfacial cooling means for selectively varying the temperature of the cooling medium to provide continuous gradient cooling on all sides of the material to maintain its physical properties uniformly throughout.

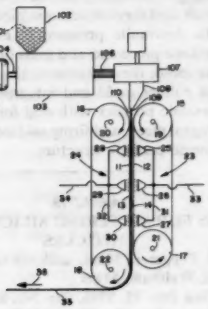
10. A method for providing uniform gradient cooling simul-

taneously on all sides of an extrudable material to maintain the physical properties uniformly through the material, comprising the steps of:

extruding the material,

providing a foraminous support member,

conveying the extruded material on the foraminous support member,



bisurfacially cooling the material by directing a cooling medium simultaneously against the sides of the extruded material, and

uniformly varying the temperature of the cooling medium to provide continuous gradient cooling on all sides of the material to maintain its physical properties uniformly thereout.

4,696,780

METHOD OF MANUFACTURING A PROSTHESIS CUFF TO RECEIVE AN AMPUTATION STUMP

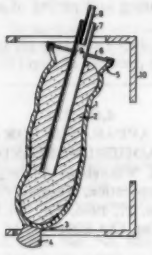
Lars Hägglund, Veberöd, Sweden, assignor to Landstingens Inkopscentral LIC, Sweden

Filed Dec. 17, 1984, Ser. No. 682,166

Claims priority, application Sweden, Dec. 21, 1983, 83070763

Int. Cl.[4] B29C *45/14, 61/02, 65/66*

U.S. Cl. 264—222 **16 Claims**



1. A method of manufacturing a prosthesis cuff to receive an amputation stump, comprising the steps of:

providing a positive cast of an amputation stump;

forming a tubularly-shaped rough prosthesis cuff by introducing a starting plastic material having thermal plastic memory into a mold, the mold having an internal shape to form the rough prosthesis with a closed end and an open end, the rough cuff defining an interior space which is smaller than the positive cast;

embedding an adaptor at the closed end of the rough cuff during formation of the rough cuff, the adaptor being suitable for connecting the rough cuff to another prosthesis part;

stretching the rough cuff to enlarge the interior space thereof sufficiently to enable the positive cast to fit in the rough cuff;

inserting and positioning the positive cast in the rough cuff;

heating the rough cuff, while the positive cast is positioned therein, in a manner that is effective for causing the rough cuff to shrink around the positive cast and to conform to the surface contour of the positive cast whereby the rough cuff is transformed into a finished prosthesis cuff; and

allowing the finished prosthesis cuff to cool and removing the positive cast from the finished prosthesis cuff.

4,696,781

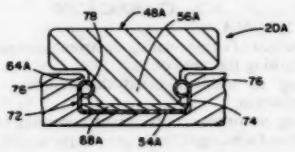
COMPOSITE FIRST WALL FOR FUSION DEVICE

Robert F. Bourque, San Diego, Calif., assignor to GA Technologies Inc., San Diego, Calif.

Filed Oct. 24, 1984, Ser. No. 664,162

Int. Cl.[4] G21B *1/00*

U.S. Cl. 376—136 **12 Claims**



1. A first wall structure for use in a plasma device including a plasma region surrounded by a vacuum region, a blanket structure, and a magnet structure, said first wall structure surrounding said plasma region and said vacuum region inside said blanket structure and said magnet structure and comprising:

a base wall coolant;

a base wall which is substantially continuous and vacuum tight and surrounds said plasma region and said vacuum region and has substantial electrical resistance parallel to the direction of plasma in said plasma region as to permit ready entry into said plasma region of magnetic flux from said magnet structure, said base wall having an inner surface facing said plasma region and an outer surface facing the base wall coolant, said inner surface having a plurality of recesses surrounding said vacuum region and providing respective thin sections of said base wall,

a plurality of discrete inserts corresponding in number to said recesses, each insert being secured in a respective recess, said inserts extending inwardly into said vacuum region beyond said inner base wall surface and being made of a material having a greater capability of transmitting heat flux through substantial thickness while withstanding thermal stresses than the material from which said base wall is formed, said thin sections transmitting to said base wall coolant heat flux transmitted by said inserts,

each of said inserts comprising a stem portion disposed in a respective recess, and an enlarged head extending from said stem toward said plasma region,

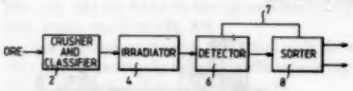
the portion of said base wall defining each recess having an undercut so that each recess has a constricted throat, and

a holder disposed in each recess below the level of said throat, said holder having side walls with enlargements, said stem having groove means with said enlargements concurrently being received by said groove means and engaging said throat to retain said inserts in their corresponding recesses.

4,696,782
ORE IRRADIATOR

Colin G. Clayton, Abingdon, and Ramon Spackman, Didcot, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 26, 1984, Ser. No. 674,738
Claims priority, application United Kingdom, Nov. 30, 1983, 8331911
Int. Cl.[4] G21G *1/06*
U.S. Cl. 376—159 10 Claims

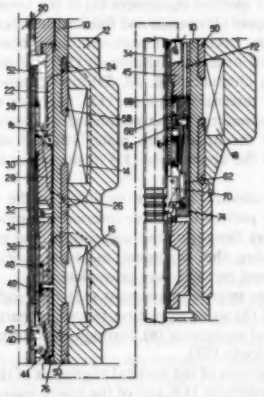


1. An irradiator for irradiating lumps of ore for detecting the presence of a selected substance in the lumps, the irradiator comprising a cylindrical chamber, means for causing the lumps to pass through the chamber, and adjacent to but outside one end of the chamber at least one coaxial annular neutron source arranged so that the resulting neutron flux in the chamber ensures that in passing through the chamber all the lumps are activated uniformly each such neutron source comprising a target which generates neutrons when a beam of ions is incident upon it, the irradiator also including means for generating a beam of ions and for directing said beam of ions onto said target in an annular pattern, said pattern being coaxial with said chamber.

4,696,783
ELECTROMAGNETIC CONTROL BAR DRIVE DEVICE, WITH REDUCED HEAT LOSSES

Guy Lesaulnier, Courbevoie, and Fernand Savary, Saint Leu La Foret, both of France, assignors to Framatome, Courbevoie, France

Filed Jan. 29, 1986, Ser. No. 823,545
Claims priority, application France, Jan. 29, 1985, 85 01216
Int. Cl.[4] G21C *7/12*
U.S. Cl. 376—228 6 Claims

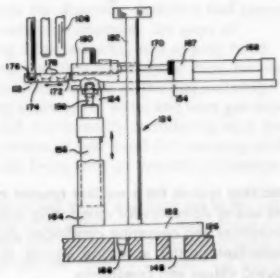


1. In a nuclear reactor having a coolant containment vessel closed with a lid, an electromagnetic device for rectilinearly moving a shaft connectable to a control bar, comprising a fluid tight casing projecting from the reactor vessel lid; a first and second sets of shaft gripping means for gripping the shaft, staggered in the longitudinal direction and movable longitudinally of said casing, the first set of means being associated with a first movable pole co-operating with a holding coil, carried by the casing and movable by energization and de-energization of the holding coil between a position in which the first set of means grips the shaft and a position in which it releases said shaft, and the second set of means being associated with a movable plunger co-operating with a transfer coil and movable, by energization and de-energization of this coil., between a position in abutment against an other pole in which the second set of means grips the shaft and a position in which it releases said shaft; a lifting coil co-operating with said other pole for moving said other pole between two positions spaced apart by a predetermined step, wherein the movable pole co-operating with the holding coil belongs to means for cutting off a thermosiphon for connection flow of coolant between the inside of the vessel and a space defined by the casing.

4,696,784
SYSTEM FOR MANIPULATING RADIOACTIVE FUEL RODS WITHIN A NUCLEAR FUEL ASSEMBLY

Ralph W. Tolino, Wilkinsburg; William E. King, Plum; Jack L. Blickenderfer, Forest Hills, and Charles H. Roth, Jr., North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 28, 1984, Ser. No. 594,157
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—245 39 Claims



1. A tool for manipulating the peripherally located fuel rods of a fuel assembly so that said rods can be visually inspected, wherein said fuel assembly includes top and bottom nozzles, each of which is connected to a support skeleton, as well as a plurality of grids, and wherein said rods are retained within said grids and confined between the top and bottom nozzles thereof, comprising:

(a) a fixture that is detachably connectable to one of said nozzles of the fuel assembly, said fixture having a plurality of holes therein;

(b) rotating means pivotally mountable within said holes of said fixture for selectively gripping and rotating said rod, and

(c) a displacing means mounted on said fixture for reciprocably displacing said rods within said fuel assembly, including a lifting assembly and a push-down assembly for lifting and pushing down a selected one of said rods, respectively,

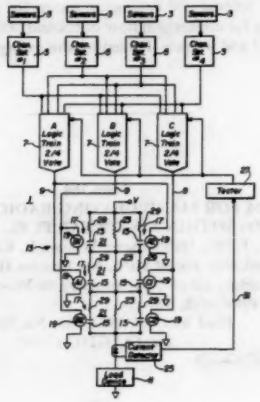
whereby said rods can be selectively rotated, lifted, and pushed down in order to expose portions of said rods which are normally hidden to visual inspection while said nozzles stay connected to said support skeleton and said rods stay confined between the top and bottom nozzles of said fuel assembly.

4,696,785

TESTABLE VOTED LOGIC POWER CIRCUIT AND METHOD OF TESTING THE SAME

Bruce M. Cook, and Jerzy Gutman, both of Plum Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 31, 1985, Ser. No. 793,383
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—245 12 Claims



4. A protection system for a nuclear reactor comprising:

redundant sets of detectors for monitoring preselected reactor parameters and operating conditions and for generating redundant partial actuation signals in response to preselected values and conditions;

three independent logic trains, to each of which each redundant partial actuation signal is applied, said logic trains each generating an actuation signal in response to a preselected number of the redundant partial actuation signals;

a load;

a voltage source;

three pairs of switches connected in three groups of two switches each with the two switches in each group associated with a different pair of switches and being connected in parallel, and with the three groups of switches being connected in series with each other and with the load across the voltage source;

means for applying a different one of said actuating signals independently to each of said pairs of switches to actuate the same, and thereby actuate the load when at least two out of the three actuation signals are generated;

a resistor shunting each group of switches to provide a leakage path between the voltage source and the load device; and

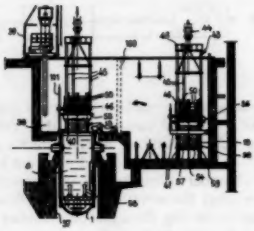
a current detector for measuring the current drawn from the voltage source, the impedance of said resistors being several magnitudes larger than the impedance of a closed switch, such that the current through the leakage path is insufficient to energize the load, but sufficient for the current measuring means to detect whether a switch is actuated.

4,696,786

PROCESS AND DEVICE FOR ADAPTING NEW UPPER INTERNAL EQUIPMENT TO THE VESSEL OF A PRESSURIZED WATER NUCLEAR REACTOR

Alain Frizot, Montcenis; Gerard Cadaureille, Saint Bonnet de Mure; Jean-Christophe Lalere, Lyons, and Jean-Yves Machuron, Le Creusot, all of France, assignors to Framatome, Courbevoie, France

Filed Jul. 29, 1986, Ser. No. 890,225
Claims priority, application France, Aug. 2, 1985, 85 11902
Int. Cl.[4] G21C *17/00, 19/00*
U.S. Cl. 376—245 13 Claims



1. Process for adapting new upper internal equipment to the vessel of a pressurized water nuclear reactor containing irradiated lower internal equipment (8) which comprises a horizontal lower plate (4), a core support shell (6) as well as the core screening (7), while the upper internal equipment (13) comprises an upper core plate (11) and a lower plate (10) which forms an upper core plate, which are held together by vertical spacer columns (12), slots (33, 28) being provided on the peripheral part of the upper plate (11) of the upper internal equipment and on the peripheral parts of the upper core plate (10), in angularly offset positions, alignment pins (20) being orovided at the upper part of the lower internal equipment (8) and centering pins (25) being fixed to the core support shell (6) which are intended to cooperate with the slots (33) in the upper plate (11) of the upper internal equipment and with the slots (28) in the upper core plate (10), respectively, for installing the upper internal equipment (3) in the vessel:

with the vessel (1) opened and filled with water, and the core assemblies having been removed, the process comprising:

means for measuring alignment (50) and means for measuring clearance (56, 58, 59) are mounted on the new upper internal equipment (13), together with a jig (54) corresponding to the peripheral assemblies of the core under the upper core plate (10) and skidblocks (53) under the upper plate (11) of the upper internal equipment,

thruster devices (52) are mounted in the region of the upper part of the lower internal equipment (8) on the support flange for the vessel head and means (55) for receiving the alignment measuring devices (50) are mounted on the lower core plate (4),

the upper internal equioment (13) is introduced into the vessel (1) so as to rest on the upper part of the lower internal equipment (8), through the intermediacy of the skid blocks (53),

measurements of the vertical alignment of the upper internal equipment (13) and of the lower internal equipment (8) are carried out,

the upper internal equipment (13) is moved on the lower internal equipment (8) by the use of the thruster devices (52) to correct their respective alignment, as a function of the results of the alignment measurements,

the clearances existing between the edge of the upper core plate (10) and the opposing part of the core support shell (6) are measured at four points spaced at equal angular intervals on the periphery of the plate (10),

if appropriate, the upper internal equipment (13) is moved again to correct the errors in the measured clearances, while a satisfactory alignment of the internal equipment (13, 8) is maintained,

the clearances existing between, on the one hand, the alignment (20) and centering (25) pins and, on the other hand the corresponding slots (33, 28) are measured,

the upper internal equipment (13) is withdrawn from the vessel (1),

adapters (31, 31*b*, 36) machined to sizes which are determined by the measurements of clearances around the pins (21, 25) are fixed to the upper internal equipment (13), inside the slots (28, 33),

the upper internal equipment (13) fitted with the adapters (31*a*, 31*b*, 36) and only the alignment-measuring devices (50) is reintroduced into the vessel (1),

and the alignment of the upper internal equipment (13) relative to the lower internal equipment (8) is checked.

4,696,787

MONITORING PRESSURE WITHIN A VESSEL

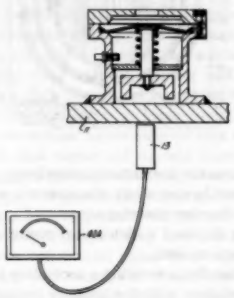
Eric Pendleton, Culcheth; Karl A. Roberts, Warrington, and Alan Murray, Roby Merseyside, all of England, assignors to National Nuclear Corporation Limited, London, England

Filed May 6, 1985, Ser. No. 731,036

Claims priority, application United Kingdom, May 21, 1984, 8412981

Int. Cl.⁴ G21C *17/06*; G01K *13/02*

U.S. Cl. 376—247 **20 Claims**



1. A vessel provided internally with a device for enabling external detection of pressure drop within the vessel, said device comprising a permanent magnet, means mounting the magnet within the vessel for movement toward and away from a boundary wall of the vessel, means for translating the internal pressure within the vessel into a force which, together with the magnetic force developed by the magnet, maintains the magnet in a predetermined position with respect to said boundary wall of the vessel, the magnet being located and arranged such that it is magnetically urged toward said predetermined position, and means responsive to the internal pressure for urging the magnet away from said predetermined position whereby, in the event of a substantial drop in pressure within the vessel, the latter means becomes effective to displace the magnet relative to said boundary wall to vary the magnetic field strength detectable by detector means located on the external side of the boundary wall.

4,696,788

PROCESS AND DEVICE FOR DETECTING DEFECTIVE CLADDING SHEATHS IN A NUCLEAR FUEL ASSEMBLY

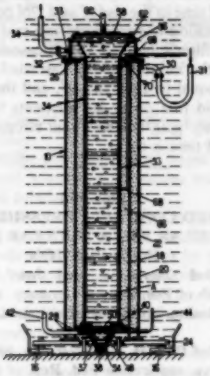
Michel Seli, Caluire, France, assignor to Framatome et Cogema "Fragema" , Courbevoie, France

Filed Aug. 8, 1985, Ser. No. 763,737

Claims priority, application France, Aug. 8, 1984, 84 12561

Int. Cl.⁴ G21C *17/00*

U.S. Cl. 376—253 **10 Claims**



1. A process for detecting defective fuel elements in a nuclear fuel assembly, comprising the steps of

(a) locating a fuel assembly in a sipping hood;

(b) causing said fuel assembly to heat for increasing gas pressure in the sheaths of the fuel assembly;

(c) forming a mixture of water and inert gas dispersed in said water and continuously introducing said mixture at the lower portion of said hood for sweeping said fuel assembly in said hood with an upward circulation of said mixture;

(d) separating said water and inert gas in the mixture leaving said hood at an upper portion of the hood above said fuel assembly and circulating the separated water and inert gas through separate respective measuring loops;

(e) continuously monitoring the presence of water-soluble fission products in the water loop by measuring the activity of the separated water and monitoring the presence of fission products dispersed in said inert gas in said gas loop, and

(f) recycling said inert gas and water to form said mixture.

4,696,789

NUCLEAR REACTOR POWER METER

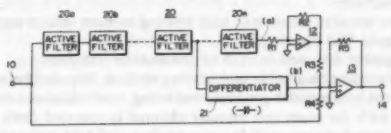
Minoru Oda, Amagasaki, and Kunio Oba, Kobe, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 23, 1985, Ser. No. 790,625

Claims priority, application Japan, Oct. 25, 1984, 59-223016

Int. Cl.⁴ G21C *17/00*

U.S. Cl. 376—254 **5 Claims**



1. A nuclear reactor power meter for measuring the output of a nuclear reactor from the concentration signal of radioiso-

tope ^{16}N contained in a primary coolant in a primary coolant loop, the nuclear reactor power meter comprising:

a detector mounted at the outlet of said reactor for detecting gamma rays radiated from said primary coolant flowing therethrough; and

a transient response correction circuit responsive to the output of said detector and including an approximated normal distribution response filter having a group delay time substantially corresponding to a single circulation time necessary for said primary coolant loop and having a rise time in the step response substantially corresponding to a spread time in the rise of said ^{16}N concentration signal due to agitation occurring during said single circulation time, said filter comprising multicascaded first order lag elements, the number of the cascaded stages being substantially equal to $2\pi(t/t_{10\text{-}90})^2$, and the time constant of each of said first order lag elements being substantially equal to $\frac{1}{2}\pi(t^2_{10\text{-}90}/t)$ where said circulation time is t and said spread time is $t_{10\text{-}90}$.

4,696,790

PRESTRESSED CONCRETE PRESSURE VESSEL, IN PARTICULAR FOR A NUCLEAR REACTOR INSTALLATION

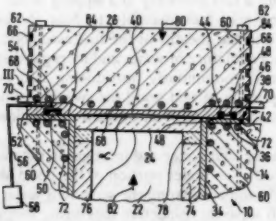
Claus Elter, Bad Duerkheim, and Josef Schoening, Hambruecken, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Dortmund, Fed. Rep. of Germany

Filed Dec. 31, 1984, Ser. No. 687,656

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1984, 3402055

Int. Cl.[4] G21C *13/06, 17/00*

U.S. Cl. 376—296 **8 Claims**



1. A prestressed concrete pressure vessel, for a nuclear reactor installation, comprising:

a concrete main body having a hollow inside section;

an opening in the main body which leads from outside the pressure vessel into the inside section;

thermal insulation disposed against said opening;

a prestressed concrete cover for closing off said opening, said cover having a periphery of lesser diameter than the main body;

a support surface surrounding said opening on the main body of the pressure vessel;

a bearing surface on the periphery of the cover bearing substantially all forces exerted on said prestressed concrete cover, which rests on said support surface, and which defines a seam between itself and said support surface;

two annular grooves in said bearing surface which encompass said opening;

a gasket disposed in each of the annular grooves;

an annular channel in said bearing surface, disposed between the two annular grooves, and being in continuous contact with the seam said annular channel is recessed from said seam between said bearing surface and said support surface;

at least one connecting channel leading from the annular channel to the outside of the pressure vessel;

a gas detector associated with said connecting channel;

a plurality of clamping elements which function to hold down the cover in such a manner that the bearing surface elastically conforms to any deformation of the pressure vessel and support surface which may result from pressure in the inside section.

4,696,791

NUCLEAR REACTOR INSTALLATION

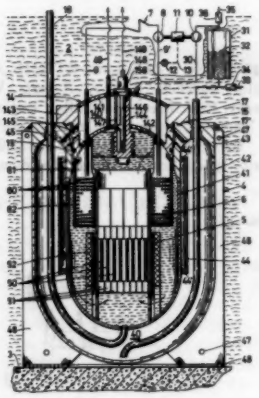
Hermann Straub, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 17, 1985, Ser. No. 756,033

Claims priority, application Switzerland, Jul. 17, 1984, 3468/84

Int. Cl.[4] G21C *9/00*

U.S. Cl. 376—299 **14 Claims**



1. A nuclear reactor installation comprising

a pressure vessel having a pair of concentric walls defining a peripheral chamber therebetween;

a reactor core disposed within said pressure vessel for heating a primary coolant;

a cooling circuit for conveying a secondary coolant in heat exchange relation with the primary coolant, said circuit including at least one primary heat exchanger within said pressure vessel, at least one secondary heat exchanger outside said pressure vessel, coolant lines extending through said pressure vessel and connecting said heat exchanges together, and circulating mens for circulating a secondary coolant through said heat exchangers;

a heat sink extending around said pressure vessel;

a source of at least on flowable heat-insulating agent outside said pressure vessel;

a source of at least one flowable heat-conductive agent outside said pressure vessel;

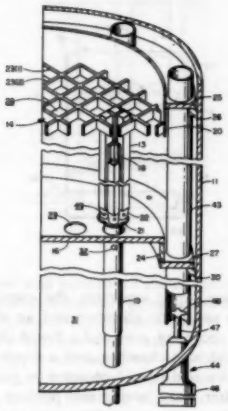
first means communicating said source of heat-insulating agent with said peripheral chamber during normal operation of said reactor core; and

second means communicating said source of heat-conductive agent with said peripheral chamber to fill said chamber with heat-conductive agent in response to a disturbance in reactor core cooling.

4,696,792
NUCLEAR REACTOR COOLANT RECIRCULATION

Robert R. Hobson, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Jul. 30, 1984, Ser. No. 635,730
Int. Cl.[4] G21C *15/06*
U.S. Cl. 376—377 7 Claims



1. A system for forcing a liquid water coolant to recirculate through an unshrouded nuclear core in a pressure vessel, said core including an array of spaced fuel assemblies supported between a lower core support member and an upper core support member, each of said fuel assemblies being fitted with a tubular flow channel for containing water coolant flowing therethrough; an annular lower support ring attached to said pressure vessel and connected to said lower core support member for support thereof, said lower core support member, said lower support ring and the lower part of said pressure vessel forming a lower plenum wherein said coolant can be pressurized; an upper support ring attached to said pressure vessel and connected to said upper core support member, a space in said pressure vessel above said upper core support member forming an upper plenum for containing water coolant; a plurality of coolant pressurizers within said pressure vessel each having a coolant inlet and a coolant outlet; a plurality of vertically oriented elongated coolant conducting conduits positioned in radially spaced relation between said core and the inner wall of said pressure vessel and extending from the upper plenum to the lower plenum, each connected to the coolant inlet of a respective one of said coolant pressurizers and each penetrating said upper support ring for conducting coolant from said upper plenum to said coolant inlet, the coolant outlet of each coolant pressurizer being in fluid communication with said lower plenum for pressurizing the coolant therein; primary coolant passages through said lower support member for admitting pressurized coolant from said lower plenum into said fuel assemblies; and coolant outlet means at the upper end of said core for discharging liquid coolant from said core to said upper plenum whereby said coolant is recirculated from said lower plenum, through said core to said upper plenum and back to said lower plenum.

4,696,793
BURNABLE POISON ROD FOR USE IN A NUCLEAR REACTOR

Gary E. Paul, Monroeville; Ronald H. Carr, Swissvale, and Lee W. Stern, Penn Hills, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 28, 1984, Ser. No. 594,156
Int. Cl.[4] G21C *3/32, 7/10*
U.S. Cl. 376—447 12 Claims

1. In a nuclear reactor fuel assembly, a nonfuel burnable poison rod comprising:

(a) a tubular metallic cladding having upper and lower closure means, said lower closure means sealing the lower portion of said tubular cladding;

(b) a neutron absorber in the form of an outer tube positioned concentrically within said tubular metallic cladding;

(c) a neutron moderating spacing means for positioning said outer neutron absorber tube in spaced relation to said lower closure means, said neutron moderating spacing means being in the form of a solid cylindrical mass of a neutron moderating material; and

(d) support means in the form of an inner metallic tube concentrically disposed within said outer neutron absorber tube and resting on said solid cylindrical mass of neutron moderating material.

4,696,794
CL-1957D ANTIBIOTIC COMPOUND AND ITS PRODUCTION

Richard H. Bunge; James C. French; Timothy R. Hurley, and Neil E. Willmer, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 835,399, Mar. 3, 1986, abandoned. This application Nov. 7, 1986, Ser. No. 928,443
Int. Cl.[4] A61K *35/74;* C12D *1/06*
U.S. Cl. 424—118 7 Claims

1. An antibiotic compound designated CL-1957D or a pharmaceutically acceptable salt thereof; compound CL-1957D being characterized by:

(a) an elemental analysis of C, 53.6%; H, 7.89%; N, 12.96%; O, 25.54%;

(b) a melting point of 182°–184° C.;

(c) an optial rotation of +17.7° (1.03% in methanol);

(d) an ultraviolet absorption spectrum that shows only end absorption in methanol;

(e) an infrared absorption spectrum in KBr showing principal absorption peaks at 2972, 2954, 2877, 1754, 1643, 1524, 1414, 1256, 1196, and 1803 reciprocal centimeters;

(f) a 200 MHz proton magnetic resonance spectrum in deuterochloroform solution showing principal signals at 0.78–0.87 (multiplet), 0.95–1.03 (multiplet), 1.20 (doublet), 1.34–1.40 (multiplet), 1.56 (singlet), 1.59–1.69 (multiplet), 1.82–2.1 (multiplet), 2.21–2.28 (multiplet), 2.67–2.79 (multiplet), 3.10–3.20 (multiplet), 3.68–3.76 (multiplet, 1 proton), 3.91 (doublet of doublets, 1 proton), 4.59–4.88 (multiplets, 4 protons), 5.04–5.15 (multiplet, 1 (proton), 5.25–5.40 (multiplet), 6.07–6.15 (multiplet), 6.47 (singlet*, 1 proton), 7.01–7.11 multiplet, 2 protons), 7.96 (singlet*, 1 proton), and 9.13 (singlet*, 1 proton) parts per million downfield from tetramethylsilane; *exchangeable with D_2O;

(g) a 75.4 MH^{13}C nuclear magnetic resonance spectrum in deuterochloroform solution showing principal 176.03, 172.52, 172.47, 171.04, 170.28, 169.17, 98.93, 78.97, 76.84, 71.75, 53.54, 52.90, 49.37, 49.04, 47.12, 46.80, 46.28, 42.13,

29.54, 38.61, 31.06, 30.97, 29.93, 27.42, 24.87, 23.89, 23.31, 21.77, 21.58, 20.38, 19.90, 19.39, 18.73, 18.18, 12.94, 11.84, and 11.64 parts per million downfield from tetramethylsilane;

(h) a retention time (high pressure liquid chromatography, μBondpak (TM) C-18-silica gel column, 3.9 mm i.d.×30 cm, Waters Associates, Milford, Ma., solvent: 0.05M ammonium phosphate buffer (pH 6.5)-acetonitrile (35:65); flow rate 1.5 ml/minute) of 6.1 minutes;

(i) a R_f (high performance thin-layer chromatography on silica gel 60F254, E. Merck, solvent: chloroform-methanol-acetonitrile-28% NH_3 (75:9:15:1)) of 0.6.

4,696,795

TEST MEDIUM FOR DETECTING PHOSPHORUS SEGREGATES IN METALLIC MATERIAL

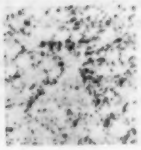
Yoshiko Funahashi; Yoshikazu Kamino; Yasuharu Matsumura, and Senichi Harimaya, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Division of Ser. No. 670,923, Nov. 13, 1984, Pat. No. 4,643,978. This application Oct. 10, 1985, Ser. No. 786,286

Claims priority, application Japan, Jul. 24, 1984, 59-153799

Int. Cl.[4] G01N *31/22*

U.S. Cl. 422—56 **6 Claims**



1. A test medium for use in detecting phosphorus segregates in a metallic material, in the form of a sheet impregnated with an aqueous solution consisting of 0.1 to 80% by weight of silver nitrate in water.

4,696,796

MOISTURE SENSOR

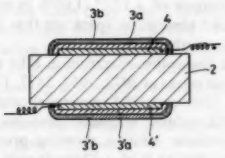
Syotaro Oka, Muko; Shu Tahara, Nagaokakyo, and Junya Kobayashi, Kyoto, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Filed Sep. 4, 1985, Ser. No. 772,562

Claims priority, application Japan, Sep. 8, 1984, 59-188660

Int. Cl.[4] G01N *27/12*

U.S. Cl. 422—88 **2 Claims**



1. A moisture sensor comprising:

(a) a solid substrate comprising a piezoelectric element;

(b) a pair of electrodes formed on said substrate; and

(c) a moisture sensitive film formed on at least one of said electrodes, said film comprising:

an inner, plasma-polymerized, highly crosslinked high polymer layer of a hydrophobic organic compound, and

an outer surface layer chemically bonded to said inner layer, said outer surface layer comprising an amino-containing highly crosslinked high polymer layer of an organic amino compound formed by plasma polymerization, said outer surface layer having incorporated therein a concentration gradient of ammonium salt-containing hydrophilic groups, decreasing from an exposed surface of said surface layer to said inner layer.

4,696,797

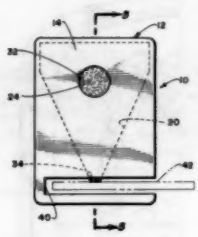
SUSPENSION LIQUID SEPARATOR

Arden A. Kelton, Fountain Valley, Calif., assignor to Environmental Diagnostics, Inc., Irvine, Calif.

Filed Apr. 15, 1985, Ser. No. 723,162

Int. Cl.[4] G01N *1/18*; B01D *15/08*

U.S. Cl. 422—101 **5 Claims**



1. In a suspension liquid separator, the combination of: a housing having a separator chamber and an eluant port, a liquid suspension receiving port and a liquid discharge port communicating with said chamber; and a depth-type, planar, liquid filter body located in said chamber in juxtaposition to said ports, said filter body having one portion adjacent said eluant and liquid suspension receiving ports and another portion adjacent said liquid discharge port, the width of said chamber at said another portion being configured such that said another portion completely fills said chamber, whereby fluid flow is restricted within said filter body.

4. In a liquid suspension separator for providing a liquid test specimen from which particulates have been removed, the combination of: a housing incorporating a separator chamber, said housing having eluant and liquid suspension ports located at one extremity of said chamber and a discharge port communicating with another extremity of said chamber; a depth-type planar liquid filter body located in said separator chamber in juxtaposition to said ports, said filter body having one portion adjacent said eluant and liquid suspension receiving ports and another portion adjacent said liquid discharge port, the width of said chamber at said another portion being configured such that said another portion completely fills said chamber, whereby fluid flow is restricted within said filter body said filter body incorporating laterally operative filtration passages whereby eluant and liquid suspension introduced into said chamber through said respective ports will be conveyed to said discharge port while said particulates are retained in said filter body; and receptor means on said another extremity adjacent said discharge port for receiving, positioning and holding a test device in immediate proximity to said discharge port.

4,696,798

CUVETTE SET FOR BLOOD ANALYSIS

Carl J. Timgren, Helsinki, Finland, assignor to Perlos Oy, Nurmijarvi, Finland

Filed Feb. 6, 1986, Ser. No. 827,276

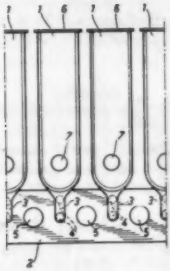
Claims priority, application Finland, Mar. 6, 1985, 850890

Int. Cl.[4] B29C *45/14*; G01N *21/03*

U.S. Cl. 422—102 **8 Claims**

1. A cuvette set for blood analysis, comprising a plurality of plastic cuvettes molded onto a carrier and guide band, each of said cuvettes including a bottom wall portion extending to first and second sets of opposed side wall portions, the side wall portions of said first set being located on opposite sides of a

first central plane of the cuvette and the side wall portions of said second set being located on opposite sides of a second central plane of the cuvette, said first central plane being essentially perpendicular to said second central plane, and an integral protrusion extending below the bottom wall portioon of the cuvette, said band comprising a strip of rigid material different from the plastic material forming said cuvettes and having two opposed flat surfaces located on opposite sides of a central plane of the strip of material, said band being located



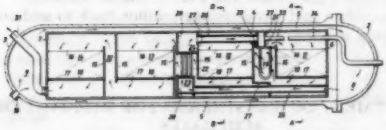
below the bottom wall portions of the cuvettes with said central plane of the strip of material being substantially parallel to said first central plane of the cuvettes, each of said protrusions extending along at least one of said flat surfaces of the band and being rigidly fixed to the band by first fastening means to accurately position said cuvettes with respect to said band, said band including second fastening means constructed and arranged to engage a control device to carry the band and cuvettes through an analyzer with the cuvettes in a proper position for analysis of samples contained therein.

4,696,799

AMMONIA SYNTHESIS CONVERTER

Stephen A. Noe, Houston, Tex., assignor to The M. W. Kellogg Company, Houston, Tex.

Filed Jul. 15, 1986, Ser. No. 885,620
Int. Cl.[4] C01C *1/04*
U.S. Cl. 422—148 **3 Claims**



1. A horizontal ammonia converter having a first end and a second end which comprises:

(a) a cylindrical pressure shell having outer heads contiguous therewith at the first and secodn ends;

(b) a cylindrical inner shell disposed within substantially the entire length of the pressure shell and defining a shell annulus therewith, the inner shell having first and second end closures contiguous with the cylindrical inner shell, the first end outer head defining a first gas plenum with the first end closure and the second end outer head defining a second gas plenum with the second end closure;

(c) gas inlet means disposed in the second end outer head in serial fluid communication with the second gas plenum, the shell annulus, and the first gas plenum;

(d) gas outlet means;

(e) first, second, and third, slab-flow catalyst beds defined by transverse bulkheads within the inner shell and opposed side portions of the inner shell, the first catalyst bed being proximate the first end of the converter and the second catalyst bed being spaced between the first and third catalyst beds, each of the catalyst beds having a top inlet face and a bottom outlet face;

(f) a first heat exchanger having an upper end and vertical U-tubes with inlet and outlet means at the upper end of the exchanger, the first heat exchanger being disposed between the first and second catalyst beds;

(g) a second heat exchanger having vertical tubes with inlet and outlet means, the second heat exchanger being disposed between the second and third catalyst beds;

(h) first longitudinal conduit means disposed within the cylindrical inner shell below and externally proximate to the first and second catalyst beds providing fluid communication between the first gas plenum and the inlet means of the second heat exchanger;

(i) second longitudinal conduit means disposed within the cylindrical inner shell above and externally proximate to only the second catalyst bed providing fluid communication between the outlet means of the second heat exchanger and the inlet means of the first heat exchanger;

(j) baffle means for conducting gas successively from the outlet means of the first heat exchanger downwardly through the first catalyst bed, across tube exteriors of the first heat exchanger, downwardly through the second catalyst bed, across tube exteriors of the second heat exchanger and downwardly through the third catalyst bed; and

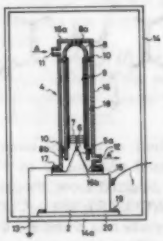
(k) means for conducting gas from the bottom outlet face of the third catalyst bed to the gas outlet means.

4,696,800

OZONE GENERATING APPARATUS

Toshihiko Sasaki; Yooji Sunayama; Isao Yoshida, all of Hyogo, and Masayuki Endo, Okayama, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1986, Ser. No. 864,384
Int. Cl.[4] C01B *13/11*; B01J *19/08*
U.S. Cl. 422—186.18 **1 Claim**



1. In an ozone generating apparatus comprising:

a housing,

a high voltage transformer within said housing,

a casing enclosing said high voltage transformer,

an ozonizer fixedly mounted within said housing,

a high voltage bushing fixedly mounted to one end of said ozonizer and electrically connected to said high voltage transformer,

the improvement wherein said ozonizer comprises:

a cylindrical ground electrode tube having a closed end and an open end,

a dielectric glass discharge tube of cylindrical shape, of a diameter less than that of the ground electrode tube, insertably mounted within the inside of said ground electrode tube, and fixedly spaced therefrom and having a closed end and an open end, said open end being proximate to the open end of the ground electrode tube,

a conductive film formed on the inner surface of the electric glass discharge tube,

said high voltage bushing is fixedly mounted to said high voltage transformer casing and projects outwardly

thereof, wherein said open end of said cylindrical ground electrode tube is fixedly mounted to said high voltage transformer casing about said high voltage bushing, and means internally of the cylindrical ground electrode tube for directly connecting said high voltage bushing to said ozonizer comprising a conductive bar extending outwardly of said high voltage bushing into the open end of said electric glass discharge tube is proximity to said conductive film, and a power supply brush connecting the end of said conductive bar to said dielectric glass discharge tube conductive film.

4,696,801

PROCESS FOR THE EXTRACTION OF METAL VALUES WITH BISIMIDAZOLE METAL EXTRACTANTS

David P. Devonald, Oldham; Anthony J. Nelson, Manchester; Peter M. Quan, Rochdale, and David Stewart, Royton, all of England, assignors to Imperial Chemical Industries PLC, London, England

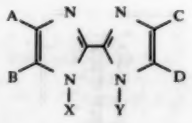
Filed Feb. 12, 1986, Ser. No. 828,748

Claims priority, application United Kingdom, Feb. 25, 1985, 8504819

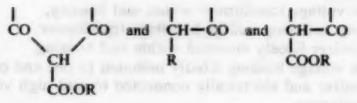
Int. Cl.[4] C01G *51/00, 3/00, 9/00, 11/00*

U.S. Cl. 423—24 **18 Claims**

1. A process for extracting metal values from aqueous solutions of metal salts containing halide or pseudo halide anions which comprises contacting the aqueous solution with a solution in a water-immiscible organic solvent of a biimidazole or bibenzimidazole extractant of formula:



wherein X and Y, which may be the same or different, taken together contain a total of from 12 to 52 saturated carbon atoms and are each selected from the group R—, RCO—, —$CH_2CO.OR$, —$CH(CO.OR)_2$ and —CO.OR wherein R is a hydrocarbyl group; or wherein X and Y taken together contain a total of from 12 to 52 saturated carbon atoms and taken together are selected from the groups



wherein R is a hydrocarbyl group; and wherein A, B, C which may be the same or different are each hydrogen or a substituent Z wherein Z is lower alkyl, halogen, nitro, cyano or—CO.OR' wherein R' is lower alkyl; or A and B taken together with the two carbon atoms joining them form an optionally substituted cyclohexene ring and/or C and D taken together with the two carbon atoms joining them form an optionally substituted cyclohexene ring; or A and B taken together with the two carbon atoms joining them form an optionally susbstituted benzene ring and/or C and D taken together with the two carbon atoms joining them form an optionally substituted benzene ring.

4,696,802

DRILLING GEOTHERMAL WELLS WITH REMOVAL OF H_2S

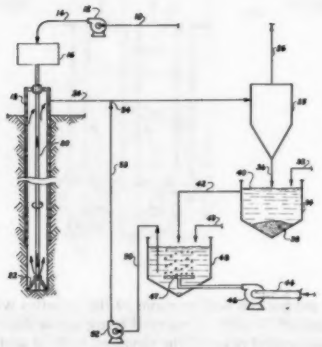
Stephen A. Bedell, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 27, 1985, Ser. No. 802,138

The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.[4] C01B *17/04;* **F03G** *7/00*

U.S. Cl. 423—226 **10 Claims**



1. A process for the treatment of raw geothermal steam produced during the drilling, flow testing, or reworking of a geothermal well whereby the H_2S gas contained in said steam is abated which comprises the steps of

(A) contacting said raw steam containing entrained solids and H_2S gas with an aqueous solution having 1 to 6 moles of ferric chelate for each mole of H_2S in said steam, 25 to 3000 parts per million of one or more water soluble cationic polymeric catalysts, and a pH in the range of 7 to 11 whereby H_2S is substantially completely absorbed and rapidly converted into sulfur solids and whereby a ferrous chelate solution is generated.

(B) separating said ferrous chelate solution from entrained solids, and sulfur solids,

(C) converting said ferrous chelate solution with an oxygen containing gas stream into a ferric chelate solution,

(D) recycling said ferric chelate solution back to said contacting step for reuse.

4,696,803

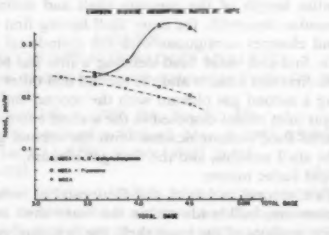
TREATMENT OF GAS STREAMS FOR REMOVAL OF ACID GASES

Edward C. Y. Nieh, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Feb. 13, 1986, Ser. No. 829,347

Int. Cl.[4] C01B *17/16*

U.S. Cl. 423—228 **5 Claims**



1. A method for the purification of a stream of gas compris-

ing a normally gaseous hydrocarbon or synthesis gas contaminated with acid gases which comprises the steps of:

countercurrently contacting said gas stream in an absorption zone with a treating agent to thereby remove a substantial portion of the acid contaminants from said hydrocarbon gas stream by absorption into said treating agent, discharging an at least partially purified hydrocarbon gas stream from said absorption zone, and discharging said treating agent enriched with absorbed acid gas components from said absorption zone, said treating agent consisting essentially of an aqueous solution of from about 40 to about 60 wt. % of N-methyldiethanolamine and from about 5 to about 15 wt. % of N,N-diethyl hydroxylamine.

4,696,804

METHOD FOR TREATING SO_2, SO_3 AND DUST SIMULTANEOUSLY

Naoharu Shinoda; Atsushi Tatani; Masakazu Onizuka; Susumu Okino, all of Hiroshima, and Taku Shimizu, Tokyo, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jan. 23, 1986, Ser. No. 821,608

Claims priority, application Japan, Feb. 5, 1985, 60-19270

Int. Cl.[4] C01B *17/00*

U.S. Cl. 423—242 **6 Claims**

1. In a method for treating an exhaust gas which contains SO_2, SO_3 and dust wherein the gas is passed through a dry dust collector to remove most of the dust, the thus treated gas is treated in an absorbing device containing an absorbent selected from the group consisting of calcium hydroxide and calcium carbonate to remove SO_2 and remaining dust, the improvement which comprises the steps of blowing air into an absorbing solution fed to said gas absorbing device in order to oxidize said absorbing solution and to thereby form a gypsum therein; separating a part of said absorbing solution into a first slurry containing mainly said gypsum grains and a second slurry containing mainly said dust by utilizing the difference between the precipitation speeds of dust and gypsum particles in the slurry; obtaining said gypsum from said first slurry; adding an alkali to said second slurry; spraying the alkali second slurry into said exhaust gas on the upstream side of said dry dust collector; collecting, drying and solidifying SO_3; and collecting the resultant solid together with said dust with said dry dust collector.

4,696,805

METHOD FOR DESULFURIZING EXHAUST GAS

Naoharu Shinoda; Atsushi Tatani; Masakazu Onizuka; Susumu Okino, all of Hiroshima, and Taku Shimizu, Tokyo, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jan. 23, 1986, Ser. No. 821,600

Claims priority, application Japan, Feb. 5, 1985, 60-19269; Feb. 5, 1985, 60-19273

Int. Cl.[4] C01B *17/00*

U.S. Cl. 423—242 **6 Claims**

1. A method for simultaneously treating SO_2 and HCl comprising passing said gas through a gas absorbing solution which absorbs SO_2 and HCl to produce an acid solution containing a sulfite and a chloride; and oxidizing section in which said sulfite is oxidized by blowing air into said absorbing solution to oxidize said sulfite; neutralizing said absorbing solution by adding a compound selected from the group consisting of $CaCO_3$ and $Ca(OH)_2$; said gas absorbing solution being passed through a closed circulating circuit for delivering said solution from said gas absorbing section to said oxidizing section, delivering said solution drawn out from said oxidizing section to said neutralizing section, and delivering said solution drawn out from said neutralizing section to said gas absorbing section; and recovering gypsum as a by-product from said absorbing solution in said closed circulating circuit; said chloride being taken out in the form of an aqueous solution.

4,696,806

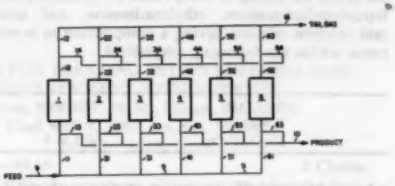
METAL HYDRIDE ADSORPTION PROCESS FOR HYDROGEN PURIFICATION

Janice C. Peterson, Allentown, and Stephen P. DiMartino, Topton, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 9, 1986, Ser. No. 849,660

Int. Cl.[4] C01B *1/32*

U.S. Cl. 423—248 **16 Claims**



1. A process for recovering hydrogen from a feed stream containing hydrogen and at least one other gaseous component, said process comprising a metal hydride adsorption cycle utilizing at least six separate metal hydride beds wherein said cycle comprises the steps of:

(a) passing the hydrogen-containing feed stream over a first metal hydride bed whereby a portion of the hydrogen contained in the feed is adsorbed by said first bed;

(b) equalizing the pressure of the first bed with another metal hydride bed in the cycle which is undergoing repressurization;

(c) rising said first bed with a hydrogen-rich stream;

(d) depressurizing the first bed to a pressure sufficient to desorb the hydrogen from the metal hydrides, thereby producing a hydrogen-rich stream;

(e) repressurizing the first bed by contacting it with effluent streams produced during the equalization and rinse steps of a subsequent metal hydride bed in the cycle;

(f) further repressurizing the first bed to bring said bed to adsorption pressure; and

(g) repeating steps (a) through (f) for each of the separate metal hydride beds such that the start of the adsorption step is staggered between successive beds by about one-half the total adsorption time.

4,696,807

CRYSTALLINE MICROPOROUS OXIDE MCM-21 AND PROCESS FOR ITS PREPARATION

Cynthia T-W Chu, Pennington, and Clarence D. Chang, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 6, 1986, Ser. No. 836,933

Int. Cl.[4] C01B *15/16*

U.S. Cl. 423—305 **6 Claims**

1. A synthetic crystalline microporous oxide material having a composition, on an anhydrous basis, expressed by the formula:

$$xR:Fe_2O_3:(1.0\pm0.2)P_2O_5$$

wherein R is an organic component resulting from organics present during synthesis of said crystalline material selected from the group consisting of compounds of tetramethylammonium, ethylenediamine, and quinuclidine, and x is from 0 to about 2; and being characterized by an X-ray diffraction pattern exhibiting values as set forth in TABLE 1 of the specification.

3. A method for preparing a synthetic crystalline microporous oxide material having a composition, on an anhydrous basis, expressed by the formula:

$$xR:Fe_2O_3:(1.0\pm0.2)P_2O_5$$

wherein R is an organic component resulting from organics present during synthesis of said crystalline material and x is from 0 to about 2, and being characterized by an X-ray diffraction pattern exhibiting values as set forth in TABLE 1 of the specification, said method comprising preparing a reaction mixture capable of forming said material upon crystallization, said reaction mixture containing sufficient amounts of alkali metal or alkaline earth metal cations, an oxide of iron, water, orthophosphoric acid and organic component selected from the group consisting of compounds of tetramethylammonium, tetrapropylammonium, ethylenediamine, and quinuclidine, said reaction mixture having a composition in terms of mole ratios within the following ranges:

$M_{2/p}O:R$	≤ 10
$R:P_2O_5$	0.01 to 3
$Fe_2O_3:P_2O_5$	0.5 to 5

wherein M is said alkali metal or alkaline earth metal cation, R is said organic component and p is the valence of M, and maintaining said reaction mixture under crystallization conditions including a temperature of from anout 50° C. to about 300° C. until crystals of said material are formed.

4,696,808

PROCEDURE TO PREPARE TRANSPARENT SILICA GELS

Patrick G. Barber, Keysville, Va., and Norman R. Simpson, Rockville, Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 24, 1986, Ser. No. 933,961
Int. Cl.[4] C01B *33/12*
U.S. Cl. 423—338 **6 Claims**

1. A process for the preparation of a transparent silica gel which is useful as a crystal growth medium which comprises the sequential steps of:

obtaining a quantity of cation exchange resin beads;

mixing said cation exchange resin beads with a concentrated solution of a soluble potassium salt;

stirring the mixture of cation exchange resin beads and soluble potassium salt solution for a period of time to allow the potassium ions to replace the cations on the resin beads;

decanting the supernatant liquid from the mixture of the previous step through a filter and rinsing the treated resin beads with distilled water;

preparing a sodium silicate solution;

transferring said treated resin beads to said sodium silicate solution and stirring the mixture for a period of time to allow the sodium ions in the solution to exchange with the potassium ions on the beads;

pouring the treated silicate solution through a filter;

adding a volume of boiled, cooled distilled water to a volume of said treated silicate solution and then adding a volume of acetic acid solution to the mixture of distilled water and treated silicate solution;

allowing the mixture of the previous step to remain at room temperature;

whereby a transparent silica gel is produced.

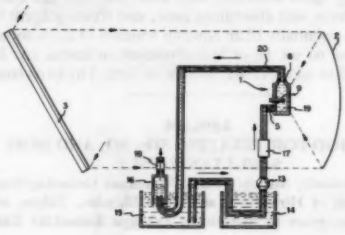
4,696,809

PROCESS AND APPARATUS FOR THERMOLYTICALLY DISSOCIATING WATER

André Vialaron, Toulouse; Gabriel Olalde, and Daniel Gauthier, both of Font Romeu, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed Oct. 29, 1985, Ser. No. 792,600
Claims priority, application France, Oct. 29, 1984, 84 16627
Int. Cl.[4] C01B *13/00, 3/06;* B01J *19/12*
U.S. Cl. 423—579 **14 Claims**

1. A process for continuously dissociating water into hydrogen and oxygen comprising thermolytically reacting the water in contact with a refractory body surface immersed therein and raised to a thermolytic temperature capable of decomposing water molecules, while maintaining said refractory-body surface (*9a*) immersed in a body of said water (**19**), and heating said surface by an energy input sufficient to maintain said surface at the thermolytic temperature within said body of water for maintaining a boiling state and vaporizing the water



thereby forming a gas film in the immediate vicinity of said surface and for assuring a decomposition of the vaporized water at said immersed surface and producing gaseous hydrogen and oxygen decomposition products, and providing the water in which the refractory body surface is immersed in a sufficient quantity for maintaining the water in liquid form around the gas film produced in the vicinity of said surface for cooling of the decomposition products.

4,696,810

WET PROCESS FOR THE PRODUCTION OF A READILY SINTERABLE POWDER MATERIAL OF PEROVSKITE OR ITS SOLID SOLUTION

Shin-ichi Shirasaki, Sakura; Yasunari Hotta, Otsu; Hiroshi Yamamura, Sakura; Shin-ichi Matsuda, Ibaraki; Kazuyuki Kakegawa, Saitama; Yusuke Moriyoshi, Sakura; Koichiro Takahashi, Sakura, and Hajime Haneda, Sakura, all of Japan, assignors to National Institute for Researches in Inorganic Materials, Niihari, Japan

Continuation of Ser. No. 717,034, Mar. 28, 1985. This application Apr. 2, 1986, Ser. No. 847,148
Claims priority, application Japan, Aug. 16, 1984, 59-171244; Aug. 16, 1984, 59-171245; Aug. 16, 1984, 59-171246
Int. Cl.[4] C01G *25/02, 23/04*
U.S. Cl. 423—593 **2 Claims**

1. A process for producing a powdered perovskite represented by the formula:

$$ABO_3$$

wherein A is selected from the group consisting of Pb, Ba, Ca, Sr and La; and B is selected from the group consisting of Ti and Zr, which comprises

contacting in a vessel an aqueous or alcohol solution of an ion of either component A or component B with a precipitating solution selected from the group consisting of solutions of ammonia, ammonium carbonate, sodium hydroxide, potassium hydroxide and oxalic acid, to form a first precipitate of said component,

mixing in said vessel an aqueous or alcohol solution of the other component thereby forming a second precipitate of said other component,

drying and calcining the resulting powder mixture at a temperature of from 400° to 1200° C., wherein during said calcining a solid phase reaction occurs in said powder mixture to form said perovskite.

4,696,811

METHOD AND COMPOSITION FOR PREVENTION AND TREATMENT OF ORAL DISEASE

Perry A. Ratcliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253

Continuation of Ser. No. 846,342, Mar. 31, 1986, abandoned. This application Dec. 29, 1986, Ser. No. 17,241

Int. Cl.[4] A61K *7/20, 33/20*

U.S. Cl. 424—53 1 Claim

1. A method for reducing dental plaque, said method comprising the step of killing and reducing the number of streptococcus mutans to a 99% level by topical application within the oral cavity for a period of ten seconds of a solution containing stabilized chlorine dioxide in a concentration in the range of 0.005% to 0.2%.

4,696,812

THROMBIN PREPARATIONS

Steven B. Silbering, Forest Hills, N.Y.; Russell U. Nesbitt, Somerville, and Mahdi B. Fawzi, Flanders, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 28, 1985, Ser. No. 791,836

Int. Cl.[4] A61K *9/70, 37/48;* A61L *15/00*

U.S. Cl. 424—445 6 Claims

1. A stable thrombin preparation consisting essentially of:
(a) about 10 to about 10,000 units/ml thrombin,
(b) an antiautolytic quantity of a buffer which maintains the pH at about 5.0 to 8.0., and
(c) about 10 to about 40 wt % of a polyhydroxy stabilizer and about 0.9 to 2.7 wt % sodium chloride.

4,696,813

MELANIN INHIBITING COSMETIC COMPOSITION

Yoshitaka Higa, Dazaifu, Japan, assignor to Sansho Seiyaku Co., Ltd., Fukuoka, Japan

Filed Jul. 3, 1985, Ser. No. 751,755

Int. Cl.[4] A61K *7/021, 35/50, 35/84*

U.S. Cl. 424—59 4 Claims

1. A cosmetic composition for inhibiting the formation of melanine comprising placentin and kojic acid, wherein the weight ratio of kojic acid to placentin ranges from about 0.1:10 to about 3:10.

4,696,814

PARENTERAL PHENYTOIN COMPOSITIONS

Shui-Hsi Kao; Allen I. Kay, both of Succasunna, and Karla Sampson, West Caldwell, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 21, 1985, Ser. No. 767,997

Int. Cl.[4] A61K *31/79, 31/415*

U.S. Cl. 424—80 12 Claims

1. An injectable composition containing a mixture of about 1–10 wt % phenytoin sodium and about 3 to about 17 wt % polyvinylpyrrolidone and having a pH of about 10 to about 12.3.

4,696,815

ANTI-DIABETIC PHARMACEUTICAL FORMS AND THE PREPARATION THEREOF

Gottfried Schepky, Ulrich-von-Hutten-Weg 2, Biberach 1, Fed. Rep. of Germany (D-7950); Rolf Brickl, Erlenweg 37, Warthausen, Fed. Rep. of Germany (D-7951); Eckhard Rupprecht, Riedbachstrasse 15, Aulendorf-Tannhausen, Fed. Rep. of Germany (D-7960), and Andreas Greischel, Dunantstrasse 5, Biberach 1, Fed. Rep. of Germany (D-7950)

Filed May 31, 1984, Ser. No. 615,892

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1983, 3320582

Int. Cl.[4] A61K *31/79, 31/495, 31/47, 31/415*

U.S. Cl. 424—80 14 Claims

1. An oral antidiabetic pharmaceutical composition consisting essentially of a conventional pharmaceutical excipient and the evaporation residue of a solution of an effective antidiabetic amount of an acidic, amphoteric or basic antidiabetic sulfonyl urea, a basic or acidic excipient and polyvinylpyrrolidone in an inert polar solvent, where the molar ratio of sulfonyl urea to basic or acid excipient is less than 1:1 and the ratio of sulfonyl urea to polyvinylpyrrolidone is about 1:0.5 to 1:10 by weight.

4,696,816

METHOD FOR TREATING INTERVERTEBRAL DISC DISPLACEMENT WITH ENZYMES

Mark D. Brown, 8900 SW. 96 St., Miami, Fla. 33176

Filed Nov. 7, 1985, Ser. No. 796,302

Int. Cl.[4] A61K *37/48*

U.S. Cl. 424—94.65 5 Claims

1. A method for the treatment of intervertebral disc displacement in humans who have been medically examined and screened for contraindications to chemonucleolysis which comprises administering an effective amount of the cartilage-dissolving enzyme chondroitenase directly into the intervertebral disc space.

4,696,817

EXTRACTION OF TEICHOMYCIN A_2 FROM WHOLE CULTURE FERMENTATION BROTH

Carl E. Snipes, and John S. Coleman, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 11, 1983, Ser. No. 540,266

Int. Cl.[4] A61K *35/74*

U.S. Cl. 424—123 19 Claims

1. A method of extracting Teichomycin A_2 from a whole culture fermentation broth containing a mycelial mass comprising
(a) mixing the broth containing the mycelial mass with an effective amount of a water miscible solvent,
(b) agitating the mixture for a time sufficient to accumulate the Teichomycin A_2 in the broth/solvent liquid,
(c) separating the broth/solvent liquid containing the accumulated Teichomycin A_2 from the mycelial mass,
(d) reducing the volume of the broth/solvent liquid to concentrate the Teichomycin A_2,
(e) precipitating the Teichomycin A_2 in the reduced volume of broth/solvent liquid, and
(f) separating the precipitated Teichomycin A_2 from the broth/solvent liquid.

4,696,818

METHOD OF TREATMENT DURING WITHDRAWL FROM DRUG DEPENDENCY

Tuk M. Kim, 2546 San Bruno Ave., San Francisco, Calif. 94134

Continuation-in-part of Ser. No. 586,060, Mar. 5, 1984, abandoned. This application Oct. 31, 1985, Ser. No. 794,404

The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

Int. Cl.[4] A61K *35/78*

U.S. Cl. 424—195.1 6 Claims

1. A method for treatment of opium, morphine or cocaine dependent human subjects comprising the step of orally administering during the period of drug withdrawal a composition comprising *Radix angelica sinensis, Herba pogostemi, Cyperus rotundus* and *Swquama manitis pendactilae* in unit dosage form.

4,696,819

ANOREXIC MATERIAL EXTRACTED FROM COCA LEAVES AND METHOD OF PREPARING

John A. Bedford; Hala N. Elsohly; Marvin C. Wilson, all of Oxford, Miss., and Carlton E. Turner, Alexandria, Va., assignors to University of Mississippi, Oxford, Miss.

Filed Apr. 30, 1982, Ser. No. 373,695
Int. Cl.[4] A61K *35/78*
U.S. Cl. 424—195.1 8 Claims

1. The method of preparing an anorexigenic cocaine free compound or mixture of compounds from coca leaves (Erythroxylon coca) comprising the first step of grinding the leaves to fine powder; second, extracting the water soluble constituents from the powder; third, treating the water soluble constituents with a base to make alkaline; fourth, extracting the water soluble constituents with water and a water immiscible organic solvent that will dissolve water insoluble organic constituents; fifth, separating the water extract from the orgainc solvent extract; and sixth, evaporating the water extract to obtain a solid residue.

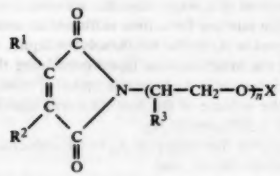
4,696,820

PHOTOSENSITIVE ELEMENTS CONTAINING POLYMER OF IMIDYLCOMPOUNDS

Beat Müller, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 724,426, Apr. 18, 1985, Pat. No. 4,629,773, which is a division of Ser. No. 405,472, Aug. 5, 1982, Pat. No. 4,532,332. This application Sep. 8, 1986, Ser. No. 904,583
Claims priority, application Switzerland, Aug. 17, 1981, 5303/81
Int. Cl.[4] G03C *1/76*
U.S. Cl. 430—271 8 Claims

1. A photographic recording material which comprises
(a) a carrier substrate, and
(b) a photosensitive, crosslinkable homopolymer as a layer thereon, said homopolymer having a molecular weight of 1000 to 1,000,000, as measured by the viscosity of a 0.5% by weight solution in methyl cellosolve at 25° C., prepared by the polymerization of an imidyl compound of formula I



(I)

wherein
R^1 and R^2 independently of one another are C_1–C_4-alkyl, or
R^1 and R^2 together are tetramethylene,
R^3 is a hydrogen atom or normal C_1–C_4-alkyl,
n is a number from 2 to 30, and
X is $-CO-CR^4=CH_2$, in which R^4 is a hydrogen atom or methyl.

4,696,821

TRANSDERMAL DELIVERY SYSTEM FOR ADMINISTRATION OF NITROGLYCERIN

Susan C. Belsole, Chester, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 11, 1983, Ser. No. 540,249
Int. Cl.[4] A61F *13/00*
U.S. Cl. 424—448 9 Claims

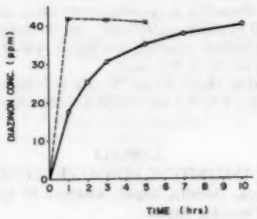
1. A tape for transdermal delivery of nitroglycerin comprising nitroglycerin-containing pyrrolidone film coated on one surface of aluminum foil with the uncoated surface of said aluminum foil mounted on the adhesive strip wherein the dimensions of said adhesive strip are larger than said aluminum foil, and said film contains 10 to 30 mg nitroglycerin dissolved in a solvent selected from the group consisting of octyl hydroxystearate, octly palmitate, mineral oil, lanolin alcohol, dimethicone fluid and capric/caprylic triglyceride and 30–70% by weight water soluble polyvinylpyrrolidone of molecular weight 10,000 to 360,000 plasticized with a plasticizer selected from the group consisting of glycerin, PEG-400, propylene glycol, sorbitol, PEG-75 lanolin oil, diethylene glycol, sorbitol, PEG 75 lanolin oil, diethylene glycol, butylene glycol, acetylated lanolin and a mixture thereof.

4,696,822

INSECTICIDAL COMPOSITIONS

Takafumi Matsumura, Mishima, and Masataka Morishita, Shizuoka, both of Japan, assignors to Toyo Jozo Company, Ltd., Shizuoka, Japan

Filed Jun. 21, 1985, Ser. No. 747,642
Claims priority, application Japan, Jul. 9, 1984, 59-140494
Int. Cl.[4] A61K *9/04*; B01J *13/02*
U.S. Cl. 424—490 9 Claims



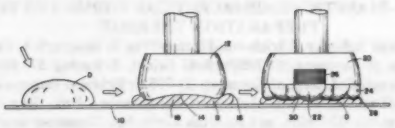
1. An insecticidal composition containing microcapsules each of which comprises a core substance having 20 to 85% by weight of an insecticidal ingredient of diazinon or chlorpyrifos and 50% or less by weight of a diluent and a wall substance having 10 to 30% by weight of a polycationic water-soluble nitrogen-containing compound and 10% by weight or less of a hardener, said composition further containing 0.25–5% by weight of a coagulation-preventing agent of noionic surfactant and 5 to 30% by weight of water-soluble thickener, said percentages being based on the weight of the composition.

4,696,823

METHOD OF MAKING A PIZZA-TYPE PRODUCT OF DOUGH

Eugene L. DeChristopher, Belvedere, Calif., assignor to Boboli, Inc., San Rafael, Calif.

Filed Jun. 2, 1986, Ser. No. 869,374
Int. Cl.[4] A21D *8/02*
U.S. Cl. 426—496 4 Claims



1. The method of making a pizza-type product of bread dough comprising the steps of:
providing a properly proofed, unsheeted dough ball of bread-type dough;
providing a press with a plurality of downwardly projecting protuberances of various lengths and cross-sections thereon;

forcing said press down against said dough ball to press it into a thick but relatively flat configuration with a plurality of dimple indentations of irregular size and spacing in the upper surface thereof, leaving rises therebetween for entrapment of gases, and

placing said dough in a heated oven and baking said dough in said oven.

4,696,824

BULK HANDLING OF RAISINS

Frank J. Meczkowski, Battle Creek, and Ronald J. Triani, Kalamazoo, both of Mich., assignors to General Foods Corporation, White Plains, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,226

Int. Cl.[4] A23L *1/212*

U.S. Cl. 426—102 **7 Claims**

1. A process for improving bulk handling, transportation and processing or raisins consisting of:

(a) coating raisins with glycerine in amounts ranging from 0.5 to 1.0% by weight of the raisins;

(b) coating the glycerine coated raisins with oil in amounts ranging from 0.5 to 1.0% by weight of the coated raisins; and

(c) packing the coated raisins in sizes of at least 1 lb. for bulk transportation without refrigeration.

4,696,825

CONTINUOUS PRODUCTION OF SHELF-STABLE MULTI-TEXTURED SHREDDED CEREAL BISCUITS HAVING A PASTE FILLING

Kevin J. Leibfred, Oakland, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Jan. 25, 1985, Ser. No. 695,059

Int. Cl.[4] A23L *1/164*

U.S. Cl. 426—283 **16 Claims**

1. A process for the continuous production of a shelf-stable paste-filled ready-to-eat shredded cereal biscuit comprising:

(a) continuously laminating a first plurality of shredded cereal dough layers, each of the layers having a plurality of generally parallel longitudinal strands and a plurality of crosshatchings generally perpendicular to said strands, said crosshatchings and said longitudinal strands forming an integral net-like sheet,

(b) continuously depositing at least one extrudate rope filling upon said first plurality of shredded layers, each extrudate rope being deposited generally parallel to said longitudinal strands,

(c) continuously laminating a second plurality of shredded cereal dough layers upon said at least one extrudate rope to obtain a filled laminate the number of crosshatchings of the integral net-like sheets adjacent to the at least one extrudate rope filling being greater than the number of crosshatchings of the next net-like sheets further removed from the filling, the crosshatchings of the net-like sheets preventing substantial penetration of the filling through said adjacent net-like sheets, said further removed net-like sheets providing a region of light texture and said adjacent net-like sheets providing region of dense texture in the filled biscuit,

(d) cutting the filled laminate, and

(e) baking the cut filled laminate.

4,696,826

PROCESS FOR MANUFACTURE OF EMULSIONS CONTAINING SOY PROTEIN

Steven J. Leusner, Lakewood; Barbara C. Raphael, Princeton, and William G. Swanhart, Jr., Plainsboro, all of N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 16, 1986, Ser. No. 864,176

Int. Cl.[4] A23C *11/08;* **A23L** *1/19;* **A23G** *9/00*

U.S. Cl. 426—565 **9 Claims**

1. A process for preparing a soy protein-containing emulsion having improved uniformity and more desirable viscosity, comprising the steps of:

(a) dispersing a soy protein material in a non-milk fat;

(b) blending said dispersion with emulsifiers, stabilizers, sodium caseinate and water; and

(c) homogenizing said blend so as to form an emulsion.

4,696,827

SILICON CARBIDE-CARBON COMPOSITE MOLDED PRODUCT AND PROCESS FOR MANUFACTURING THE SAME

Kiyohito Okamura; Yoshio Hasegawa, both of Ibaraki; Yoshiyasu Kuroo, Koganei, and Masana Ugaji, Tokyo, all of Japan, assignors to Sony Corporation and The Foundation: The Research Institute for Special Inorganic Materials, both of Tokyo, Japan

PCT No. PCT/JP83/0076 §371 Date Nov. 9, 1983 §102(e) Date Nov. 9, 1983

PCT Filed Mar. 11, 1983

Continuation of Ser. No. 557,183, filed as PCT JP83/00076 on Mar. 11, 1983, abandoned. This application Dec. 6, 1985, Ser. No. 805,268

Claims priority, application Japan, Mar. 12, 1982, 57-39771

Int. Cl.[4] B05D *3/06, 3/02*

U.S. Cl. 427—36 **16 Claims**

1. A process for manufacturing a silicon carbide-carbon composite molded product, comprising the first step of securing an organic silicon polymer having a skeleton consisting mainly of carbon-silicon bonds to an organic polymer base material having a desired shape and capable of forming a fibrous, granular or filmy carbon structure when it is burned in a non-oxidizing atmosphere, and the second step of burning said base material at a temperature ranging from 700° C. to 2,000° C. in a vacuum or in a non-oxidizing gas atmosphere to thereby thermally decompose said organic silicon polymer and create an inorganic matrix consisting mainly of SiC in which said fibrous, granular or filmy carbon structure exists in amorphous form.

4,696,828

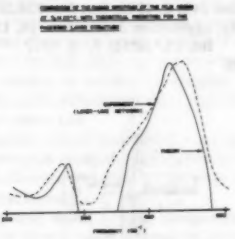
PASSIVATION OF INP BY PLASMA DEPOSITED PHOSPHORUS

Rozalie Schachter, Flushing; Marcello Viscogliosi, North Tarrytown; Lewis A. Bunz, Peekskill; Diego J. Olego, Croton-on-Hudson; Harvey B. Serreze, Pound Ridge, all of N.Y., and Paul M. Raccah, Chicago, Ill., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 581,115, Feb. 17, 1984, abandoned. This application May 21, 1985, Ser. No. 736,750

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—38 **13 Claims**



1. A method of reducing the density of surface states of InP near the conduction band comprising depositing an amorphorous phosphorous film thereon in an RF plasma.

4,696,829

PROCESS FOR INCREASING THE WEAR LIFE OF CERAMIC DIES AND PARTS

Keith O. Legg, Atlanta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation of Ser. No. 614,555, May 29, 1984, abandoned. This application Sep. 3, 1985, Ser. No. 772,187
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—38 14 Claims

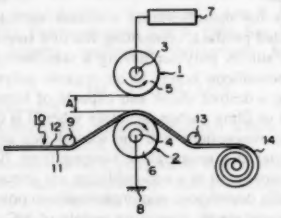
1. A process for increasing the wear life of ceramic dies and other ceramic parts which comprises firing a beam of nitrogen, carbon or carbon monoxide ions into said ceramic dies and other parts which an energy sufficient to implant said ions in said die and other parts, thereby improving the wear resistance of the same.

4,696,830

PROCESS FOR PREPARATION OF WATER-PROOF SHEETS

Tsutomo Obayashi, Tokyo; Shinobu Watanabe, Ora, and Kazuhide Ino, Soka, all of Japan, assignors to Hiraoka & Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 782,355, Oct. 1, 1985. This application Jun. 12, 1986, Ser. No. 873,764
Int. Cl.[4] C05D 3/06
U.S. Cl. 427—41 2 Claims



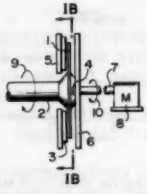
1. A process for the preparation of a water-proof fabric sheet having polymer coatings on both surfaces of a fibrous textile fabric substrate, which has been formed into said substrate through the use of weaving, non-woven and knitting fabric forming techniques, comprising the steps of:
(a) treating the fibrous fabric substrate with a water repellant treatment;
(b) subjecting both surfaces of the treated fabric to corona discharge treatment; and
(c) forming a polymer coating on both surfaces of the fabric.

4,696,831

METHOD OF ORIENTING MAGNETIC DISC BY MAGNETIC FIELD

Isao Sakaguchi, and Tatsuo Kawaide, both of Odawara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 5, 1986, Ser. No. 826,338
Claims priority, application Japan, Feb. 14, 1985, 60-26896
Int. Cl.[4] B05D 3/14, 5/12
U.S. Cl. 427—48 8 Claims



1. A method of orienting magnetic particles in the thin magnetic film of a magnetic disc in the circumferential direction of the magnetic disc by applying a horizontal magnetic field to the magnetic disc in the circumferential direction thereof immediately after the thin magnetic film has been formed on the magnetic disc, said method comprising:
a first step of performing particle orientation in such a manner that a magnetic field formed between a pair of magnetic poles which have the same polarity and are disposed so as to be substantially symmetrical with respect to a magnetic disc, is applied to both surfaces of said magnetic disc; and
a second step of performing particle orientation in such a manner that a magnetic field due to a magnetic pole of a first polarity and a magnetic field due to a magnetic pole of a second polarity are alternately applied to at least one surface of said magnetic disc which has been subjected to particle orientation by said first step.

4,696,832

CONTACT STABILIZATION COATING MATERIAL FOR ELECTRICAL CONTACT SURFACES AND METHOD

William M. D. Wright, Richmond Hill, Canada, assignor to D. W. Electrochemicals Ltd., Richmond Hill, Canada

Continuation-in-part of Ser. No. 743,643, Jun. 11, 1985, abandoned, which is a division of Ser. No. 613,319, May 23, 1984, abandoned. This application Jun. 19, 1986, Ser. No. 876,082
Int. Cl.[4] B05D 5/12; B32B 9/04
U.S. Cl. 427—58 20 Claims

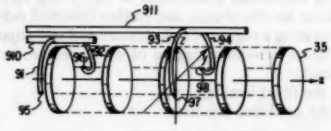
1. A method of coating electrical contact surfaces so as to enhance the flow of electrical signal current between such surfaces at frequencies in the range of from DC to Ultra High Radio Frequencies, comprising the step of applying an amount of a contact stabilization material to at least one of a pair of co-operating contact surfaces in such quantity that both said co-operating contact surfaces will have a substantial portion of each coated by at least a very thin film of said material when said co-operating contact surfaces are placed in co-operating contact relationship one to the other; wherein said contact stabilization material comprises at least one block polymer of poloxypropylene together with polyoxyethylene.

4,696,833

METHOD FOR APPLYING A UNIFORM COATING TO INTEGRATED CIRCUIT WAFERS BY MEANS OF CHEMICAL DEPOSITION

Kenneth A. Monnig, Palo Alto, Calif., and David W. Quint, Ft. Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 412,327, Aug. 27, 1982, abandoned. This application Oct. 30, 1985, Ser. No. 794,311
Int. Cl.[4] H01L 21/88
U.S. Cl. 437—225 3 Claims



1. An improved method of coating integrated circuit wafers by a chemical vapor deposition process of the type in which reactant gases are supplied into a reaction chamber that is enclosed by a chamber wall having a cylindrical side wall and a a pair end walls, said improvement comprising the step of:
encircling the volume containing the wafers with a cylindrical liner which is adjacent to the edges of the wafers, whereby the amount of reactant prdoucts depositing on the side wall of the reaction chamber is reduced and

whereby deposits on the side wall which flake off of the side wall are prevented from falling onto the wafers;

at least one of the reactant gases is supplied into the reaction chamber as a plurality of jets of gas that are directed against the inside of the liner before the jets pass into the vicinity of the wafers, thereby producing a turbulence which mixes said at least one of the reactant gases with the other reactants before dispersing them into the vicinity of the wafers;

said jets having the same circumferential direction about the axis of the cylindrical liner so that the reactant gases receive a net rotational motion around the edges of the wafers.

4,696,834

SILICON-CONTAINING COATINGS AND A METHOD FOR THEIR PREPARATION

Sudarsanan Varaprath, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 28, 1986, Ser. No. 835,029

Int. Cl.[4] B05D *5/12*

U.S. Cl. 437—223 **12 Claims**

1. A method of forming silicon-containing coatings on a solid substrate, which method comprises decomposing in a reaction chamber a halosilane, halodisilane, or mixture of halosilanes in the vapor phase, in the presence of a metal catalyst and a substrate, at a temperature in the range of 400 degrees to 600 degrees Centigrade, wherein the halosilane, halodisilane, or halosilanes each contain at least one halogen atom selected from the group consisting of fluorine, chlorine, bromine, and iodine, and wherein the catalyst is selected from the group consisting of chromium, magnesium, stainless steel, copper, and zirconium, whereby a substrate containing a coating thereon is obtained.

4,696,835

PROCESS FOR APPLYING AN ELECTRICALLY CONDUCTING POLYMER TO A SUBSTRATE

Louis Maus, Camarillo; Edward F. Witucki, Van Nuys, and Leslie F. Warren, Camarillo, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 646,717, Sep. 4, 1984, Pat. No. 4,617,228. This application Jul. 8, 1986, Ser. No. 883,260

Int. Cl.[4] B05D *3/02, 5/12*

U.S. Cl. 427—121 **24 Claims**

1. A process for producing an electrically conductive composite which comprises:

(a) contacting a dielectric substrate with a solution of a strong oxidant capable of oxidizing a pyrrole to a pyrrole polymer,

(b) drying said substrate, and

(c) contacting the so treated substrate with the vapors of a pyrrole and oxidizing said pyrrole by said strong oxidant in the presence of a substantially non-nucleophilic anion, and depositing polypyrrole on said substrate.

4,696,836

HAND STAMP METHOD FOR APPLYING ADHESIVES

Wolfgang Dierichs, Duesseldorf; Gerhard Gierenz, Solingen, and Gabriella Kraus, Neuss, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 2, 1986, Ser. No. 847,417

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1985, 3512818

Int. Cl.[4] B05D *5/10*

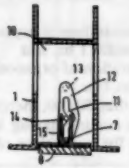
U.S. Cl. 427—208.4 **16 Claims**

1. A method of applying a liquid adhesive to an intended surface using a hand stamp adhesive applicator comprising the steps of:

(a) storing a liquid adhesive within a container supported in a housing of the applicator;

(b) retaining in a pore system of a compressible adhesive transfer stamp pad a quantity of liquid adhesive transfered to the stamp pad from the container;

(c) transfering liquid adhesive from the pore system of the stamp pad to an outer surfce of an adhesive applying stamp body made of a material non-permeable to the liquid adhesive when the stamp body is in an upwardly facing inoperative position in contact with a lower surface of the stamp pad; and



(d) applying the adhesive from the outer surface of the stamp body to the intended surface by moving the applicator at a right angle to the intended surface to thereby move the stamp body away from the stamp pad, rotate the stamp body 180° to a downward operative position and press the outer surface of the stamp body to the intended surface.

4,696,837

CHEMICAL VAPOR DEPOSITION METHOD OF PRODUCING FLUORINE-DOPED TIN OXIDE COATINGS

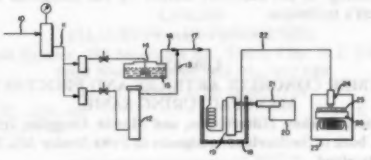
Goerg H. Lindner, KV Vlissingen, Netherlands, assignor to M&T Chemicals Inc., Woodbridge, N.J.

Continuation-in-part of Ser. No. 748,648, Jun. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 687,067, Dec. 28, 1984, Pat. No. 4,590,096. This application Nov. 12, 1985, Ser. No. 797,364

The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.[4] C23C *16/40*

U.S. Cl. 427—255.3 **62 Claims**



1. An improved chemical vapor deposition method of producing a fluorine-doped tin oxide coating which has a minimum and constant sheet resistance under different process conditions, comprising:

(a) forming a liquid coating composition comprising:

(1) an organic fluorine dopant wherein at least one fluorine atom is located alpha or beta to a functional group wherein carbon is bonded to oxygen selected from carboxylic acid, anhydride, ester, alcohol, ketone, acid halide, or ether; and

(2) an organotin compound, which is an alkyltin trichloride, a dialkyltin dichloride an alkyldichlorotin acetate, a dialkylchlorotin diacetate, or an ester tin trichloride; or tin tetrachloride;

(b) vaporizing said liquid coating composition into a wet carrier gas to form a vapor mixture of carrier gas, water, organic fluorine dopant and said organotin compound or said tin tetrachloride; and

(c) decomposing said vapor mixture on a substrate to form said coating, characterized in that: the vapor concentra-

tions of said components are such that a parameter M, defined as:

$$M = \frac{(AIR)\,(H_2O)}{(OFD)\,(O)}$$

where

(AIR) is the concentration of the carrier gas, in moles 1 hr,

(H_2O) is the concentration of water in the carrier gas, in moles 1 hr,

(OFD) is the concentration of organic fluorine dopant in the carrier gas, in moles 1 hr, and

(O) is the concentration of organotin compound in the carrier gas, in moles 1 hr,

has a value of less than 50,000, thereby to produce a fluorine-doped tin oxide coating having a minimum and constant sheet resistance for said values of M.

4,696,838

METHOD OF FORMING BUILT-UP FILM OF FLUORINATED ALIPHATIC COMPOUND ON SUBSTRATE SURFACE

Seizo Miyata; Hidenari Nakahama, and Takeshi Kasuga, all of Tokyo, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jun. 16, 1986, Ser. No. 874,847

Claims priority, application Japan, Jun. 26, 1985, 60-137850

Int. Cl.[4] B05D *1/36*

U.S. Cl. 427—407.2 **7 Claims**

1. A method of forming a built-up film of a fluorinated aliphatic compound having a hydrophilic group at one terminal on a solid substrate surface, the method comprising the steps of:

spreading a monomolecular film of a compound represented by the general formula $CF_3(CF_2)_n(CH_2)$—X, wherein X represents a hydrophilic group, n is an integer from 5 to 20 and m is 0 or an integer from 1 to 10, on the surface of an aqueous phase which comprises trivalent metal ions;

transferring said monomolecular film onto a solid substrate surface by the Langmuir-Blodgett's technique; and

repeatedly transferring the monomolecular film onto the surface of the monomolecular layer or layers already existing on the substrate surface by the Langmuir-Blodgett's technique.

4,696,839

POLYMER CONCRETE ARTICLES AND PROCESS FOR MANUFACTURING SAME

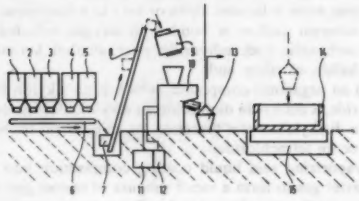
Hansjoerg Renker, Hilterfingen, and Martin Abegglen, Interlaken, both of Switzerland, assignors to Fritz Studer AG, Thun, Switzerland

Filed Feb. 5, 1986, Ser. No. 826,208

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503763

Int. Cl.[4] C08K *3/36*

U.S. Cl. 428—15 **20 Claims**



1. A polymer concrete article comprising:

substantially cubic rock particles having a grain size at least equal to a preselected value, said rock particles abutting in a substantially planar manner, said rock particles having a first modulus of elasticity, and

mechanically resistant fine particles having a grain size less than said preselected value and having a second modulus of elasticity greater than said first modulus of elasticity, said fine particles being located essentially in hollow spaces between said cubic particles, and

a binding agent.

4,696,840

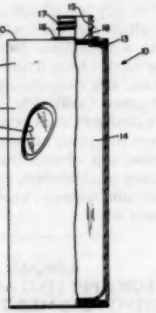
BLOWN BAG-IN-BOX COMPOSITE CONTAINER AND METHOD AND APPARATUS FOR MAKING THE SAME

Michael J. McCullough, Ft. Thomas, Ky.; Gary E. McKibben, Cincinnati, and John E. Skidmore, Hamilton, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 13, 1985, Ser. No. 808,587

Int. Cl.[4] B65D *1/08*

U.S. Cl. 220—462 **9 Claims**



1. A bag-in-box composite container comprising:

(a) a one-piece outer box constructed from a rigid material and having a continuous side wall and at least one end panel joined thereto thereby defining a hollow box cavity, said at least one end panel having an aperture therein; and

(b) a one-piece inner bag located within said hollow box cavity of said outer box, said inner bag being blow-molded from a preformed tube and having an integrally formed ouring spout connected thereto, said pouring spout extending through said aperture in said end panel and having an outer surface, wherein said inner bag and said pouring spout are an integrally-formed unit having no heat seals or other discontinuities at their attachment interface.

4,696,841

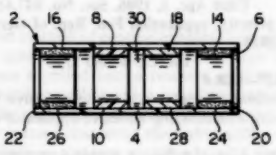
HEAT RECOVERABLE TERMINATION DEVICE

Lajos J. Vidakovits, Mountain View, Calif., assignor to Raychem Corp., Menlo Park, Calif.

Filed May 28, 1985, Ser. No. 738,623

Int. Cl.[4] H01R *4/00*

U.S. Cl. 428—36 **19 Claims**



1. A termination device comprising:

a dimensionally heat-unstable tubular member having a wall, a fusible insert and a dimensionally heat-unstable insert;

wherein dimensionally heat-unstable refers to said tubular member and said heat-unstable insert having plastic or elastic memory which defines the property of certain materials as being unstable at higher temperatures so that when the materials are exposed to this higher temperature, the materials return to their heat-stable shape;

said fusible insert and said dimensionally heat-unstable insert positioned within said tubular member and in abutting relationship with the wall of said tubular member;

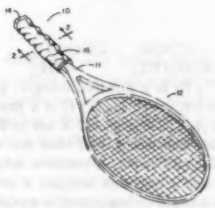
said fusible insert being meltable and said dimensionally heat-unstable insert being recoverable at a temperature used to recover said tubular member.

4,696,842

CUSTOM MOLDABLE HAND GRIP

Ruxton C. Doubt, Rte. 1, Box 414, Vashon, Wash. 98070

Filed Mar. 26, 1986, Ser. No. 844,084
Int. Cl.[4] A63B *49/08*
U.S. Cl. 428—40 **21 Claims**



1. A moldable article, for individualizing the hand grip surface of an implement, said article comprising:

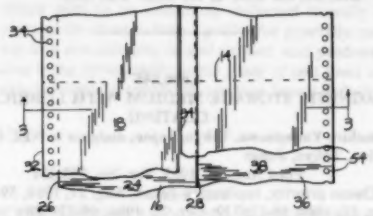
a sheet of dripless, dough-like moldable polymeric material pliable at room temperature, and wrapable around the hand grip surface of the implement to substantially cover the hand grip surface, said sheet having opposed end portions positionable together in generally end-to-end relationship, said sheet being of sufficient thickness to form a molded impression therein of a desired depth upon the intended user of the implement grasping the hand grip surface with said sheet therebetween, said moldable polymer material including a polymer, partially solvated by a volatile solvent into a moldable mass, said material having a consistency sufficiently soft to readily accept the impression under normal hand-applied pressure and sufficiently firm to permit handling prior to formation of the impression without significant deformation and to hold the impression immediately upon its formation and as evaporation of said solvent occurs without the intended user continuing to grasp the hand grip surface, said sheet being covered by at least one removable film layer covering an outward facing surface of said sheet and preventing evaporation of said solvent prior to formation of the impression, said sheet allowing gradual evaporation of said solvent after removal of said film layer at a rate sufficiently slow to allow formation of the impression into said sheet, and upon sufficient evaporation of said solvent curing into a permanent molding retaining the impression.

4,696,843

DIFFERENTIAL PRESSURE SENSITIVE ADHESIVE JOINED BUSINESS FORM

Eric R. Schmidt, Palatine, Ill., assignor to Uarco Incorporated, Barrington, Ill.

Filed Nov. 19, 1986, Ser. No. 932,358
Int. Cl.[4] B32B *3/06*
U.S. Cl. 428—41 **13 Claims**



1. A continuous business form comprising:

an elongated ply of first label stock of a desired width and having one side coated with a first pressure sensitive adhesive having a given adhesive characteristic;

an elongated ply of first release liner stock of about said desired width and having a release side releasably engaged with said first adhesive on said one side;

said first release liner and said first label stock plies being laterally offset from one another so that a narrow longitudinal strip of said first adhesive unengaged with said first release liner exists;

an elongated ply of second release liner stock of greater width than said narrow strip and releasably adhered at one edge to said first label stock at said narrow longitudinal strip of first adhesive; and

an elongated ply of second label stock having one side coated with a second pressure sensitive adhesive having a given adhesive characteristic;

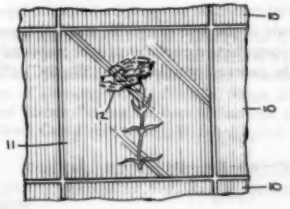
said second label stock and said second release liner being releasably adhered to each other by said second adhesive.

4,696,844

FILM TYPE AIR FRESHENER

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Nov. 20, 1986, Ser. No. 932,610
Int. Cl.[4] B32B *3/14*; B44C *1/28*
U.S. Cl. 428—46 **6 Claims**



1. An air freshener in combination with a wall tile having predetermined dimensions and a smooth surface having a solid color, which tile is identical to other tiles in an array thereof on the same wall, comprising:

A a transparent, flexible film of polymeric material having substantially the same dimensions as the tile impregnated with a volatile fragrance that is slowly released from the film, the fragrance being in a concentration resulting in a relatively prolonged emission thereof from the film;

B a low-tack, pressure-sensitive adhesive coating on the rear face of the film whereby the film may be adhered onto said tile and later peeled therefrom without difficulty when the fragrance is exhausted; and

C an artwork imprinted on the film, the fragrance being thematically related to the artwork, whereby the visual impression made by the artwork is enhanced by the fragrance and the artwork is seen against the color of the tile which is the same as the other wall tiles.

4,696,845

MAGNETIC STORAGE MEDIUM WITH LUBRICATING COATING

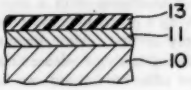
Masahiro Yanagisawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 23, 1985, Ser. No. 768,834

Claims priority, application Japan, Aug. 27, 1984, 59-177949; Oct. 22, 1984, 59-221729; Oct. 22, 1984, 59-221730

Int. Cl.[4] G11B 5/71

U.S. Cl. 428—64 **28 Claims**



1. A magnetic storage medium, comprising a layer of a ferromagnetic material coated on a base and a lubricant layer formed on the outer side of the ferromagnetic material layer, said lubricant layer comprises a perfluoroalkyl compound represented by the general formula (1):

$$R_f\text{—}J'\text{—}CF_2\text{—}J\text{—}_n\text{—}R_f \quad (1)$$

wherein R_f represents C_mF_{2m+1} (m is a positive integer), n is a positive integer not smaller than 5, J and J′ each represent

$$-O-,\ -S-,\ -\overset{\overset{O}{\|}}{C}-O-,\ -\overset{\overset{O}{\|}}{C}-NH-,\ -NH-,$$

$$-NHC(=O)-O-,\ -\overset{\overset{O}{\|}}{C}-\ \text{or}\ -\overset{\overset{OH}{|}}{CH}-.$$

23. A magnetic medium comprising a layer of a ferromagnetic material coated on a base and a lubricant layer formed on the outer side of the ferromagnetic material layer, said lubricant layer comprising a perfluoroalkyl compound represented by one of the general formulas (5A), (5B), (5C), (5D), (5E) and (5F):

$$R_f\text{—}J'^{*}\text{+}\underset{\underset{C_{k'}F_{2k'+1}}{|}}{\overset{\overset{C_kF_{2k+1}}{|}}{C}}\text{—}J'\text{+}_p\text{+}R_f'\text{—}O\text{+}_q R_f^{*} \quad (5A)$$

$$R_f\text{—}J'^{*}\text{+}C_iF_{2i}\text{—}J'''\text{+}_p\text{+}R_f'\text{—}O\text{+}_q R_f^{*} \quad (5B)$$

$$G\text{—}R\text{+}\underset{\underset{G'}{|}}{\overset{\overset{C_kF_{2k+1}}{|}}{C}}\text{—}J'\text{+}_p\text{+}\underset{\underset{G'}{|}}{R_f'}\text{—}O\text{+}_q R'\text{—}G' \quad (5C)$$

$$G\text{—}R\text{+}\underset{\underset{G'}{|}}{C_iF_{2i-1}}\text{—}J'\text{+}_p\text{+}\underset{\underset{G'}{|}}{R_f'}\text{—}O\text{+}_q R'\text{—}G' \quad (5D)$$

-continued

$$R_f\text{—}J''^{*}\text{+}\underset{\underset{J'^{*}}{|}}{R_f}\text{—}J'\text{+}_p\text{+}R_f'\text{—}O\text{+}_q R_f^{*} \quad (5E)$$

$$R_f^{**}\text{—}J^{*}\text{—}R_f^{*}\text{—}J''\text{+}_p\text{+}R_f'^{*}\text{—}O\text{+}_q R_f^{***}$$

$$R_f\text{—}J''^{*}\text{+}\underset{\underset{J'^{*}}{|}}{R_f}\text{—}J'\text{+}_p\text{+}R_f'\text{—}O\text{+}_q R_f^{*} \quad (5F)$$

$$R_f^{**}\text{—}J^{*}\text{+}R_f^{*}\text{—}J''\text{+}_p\text{+}R_f'^{*}\text{—}O\text{+}_q R_f^{***}$$

wherein R_f, R_f^{*}, R_f^{**} and R_f^{***} each represent C_mF_{2m+1} (m is a positive integer), R_f', R_f'', $R_f'^{*}$ and $R_f''^{*}$ each represent a radical consisting of carbon and fluorine atoms, J′, J″, J‴, J′*, J″* and J* each represent one of —O—, —S—,

$$-\overset{\overset{O}{\|}}{C}-,\ -\overset{\overset{O}{\|}}{C}-O-,\ -\overset{\overset{OH}{|}}{CH}-,\ -\overset{\overset{O}{\|}}{C}-NH-,$$

—NH—, —NH—CO—, —NHCO—NH— and —NHCOO— or a combination of two or more thereof on condition that J‴ never represent —O—, R and R′ each represents C_wX_{2+2} (w is 0 or an integer, X represent H, F, Cl, Br or I), G and G′ each represent a functional group selected from —NCO, —SH, $-SO_3H$, $-SO_3M$ (M represents Na, K or Li), —CN, —NCS, $-NO_2$,

$$-CH\text{—}\overset{\diagdown\ \diagup}{O}\text{—}CH_2,$$

$-CONH_2$, —I, —COOH, $-COOC_jH_{2j+1}$ (j is a positive integer), $-C_iH_{2i}OH$, $-NH_2$, $-CH{=}CH_2$, $Si(C_hH_{2h+1})_gX_{3-g}$ (h is a positive integer, g is 0, 1 or 2, X represents Cl, —OH, $-OC_fH_{2f+1}$ (f is a positive integer) or $-A-Si(C_hH_{2h+1})_gX_{3-g}$ (h, g and X are as defined above, A represents a radical consisting of at least one element selected from C, H, N, O and S), p is a positive integer, q is 0 or a positive integer, k is a positive integer, k′ is 0 or a positive integer, p′ is 0 or a positive integer, q′ is a positive integer and i is 0 or a positive integer when referring to G and G′ and i is a positive integer in all other cases.

4,696,846

METHOD FOR FORMING PROTECTIVE LAYER ON A FLEXIBLE MAGNETIC DISC SHEET

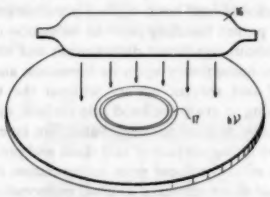
Mikihiko Kato; Shigeo Komine; Kazuhiko Morita, and Yasutoshi Okuzawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 658,712, Oct. 9, 1984, Pat. No. 4,647,473. This application Jul. 31, 1986, Ser. No. 891,070

Claims priority, application Japan, Oct. 7, 1983, 58-188221

Int. Cl.[4] G11B 5/72

U.S. Cl. 428—65 **4 Claims**



1. A flexible magnetic disc comprising a flexible magnetic disc sheet and a jacket enclosing said disc sheet, wherein both of said disc sheet and said jacket have central apertures, and

the diameter of the aperture of said jacket is larger than the diameter of the aperture of said disc sheet, with a protective layer provided on a surface portion surrounding the edge of the aperture of the disc sheet, and said protective layer has an inner diameter larger than the diameter of the aperture of the disc sheet and an outer diameter smaller than the diameter of the aperture of the jacket enclosing the disc sheet, and said protective layer is formed by screen-printing a radiation polymerizable composition on said surface portion surrounding the edge of aperture of the disc sheet and hardening the composition by exposure to radiation, wherein the flexible magnetic disc has the protective layer about the central aperture thereof and a small coefficient of friction with respect to a position-determining means.

4,696,847

INSULATING AND IMPERVIOUS ROOFING PANELS

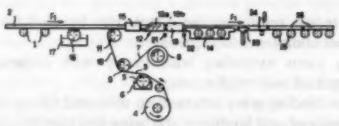
Stephane Cousin, Lamorlaye, and Jean-Paul Boumendil, Paris, both of France, assignors to Isover Saint-Gobain, Courbevoie, France

Division of Ser. No. 547,219, Oct. 31, 1983. This application Sep. 16, 1986, Ser. No. 907,984

Claims priority, application France, Oct. 29, 1982, 82 18166

Int. Cl.[4] B32B *1/04*

U.S. Cl. 428—76 **20 Claims**



1. A heat insulating and liquid impervious fibrous panel positionable between a roof with a slight slope and at least one hot applied bituminous coating or sheathing, comprising:

a mat consisting of a dense felt of mineral fibers bonded together by a first thermosetting binder finely dispersed in the felt, and a composite waterproof impervious covering comprising a reinforcing layer of mineral fibers impregnated with a second binder and glued by said second binder to said dense felt and, a sheet of separating agent capable of binding to the reinforcing layer by means of said second binder impregnating said reinforcing layer, and capable of selt hot welding.

4,696,848

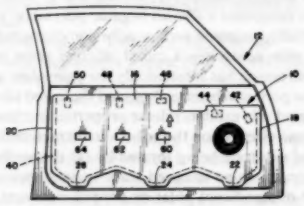
SURFACE PROTECTOR WITH EXPANSIBLE POCKET

Wallace R. Jones, Waite Hill Village, and Robert A. Isaksen, Chardon, both of Ohio, assignors to The Excello Specialty Company, Cleveland, Ohio

Filed Jul. 9, 1986, Ser. No. 883,826

Int. Cl.[4] B32B *3/02, 3/28*

U.S. Cl. 428—80 **17 Claims**



1. A shield device for use in protecting a surface comprising:

(a) a generally flat and relatively thin sheet of flexible plastic material having a peripheral edge shaped to generally conform to the shape of the surface to be protected;

(b) adhesive means carried by said sheet at least in areas adjacent said peripheral edge for allowing said sheet to be joined to the surface to be protected; and,

(c) a predetermined area of said sheet being at least partially enclosed by a series of relatively small and closely spaced deformations formed to extend outwardly over the plane of the sheet a short distance for permitting said predetermined area to be selectively deflected laterally of the plane of the sheet to form a pocket for generally conforming to a discontinuity in said surface, said predetermined area being substantially in the plane of said sheet until an external force is applied to produce lateral deflection.

4,696,849

PROCESS FOR PREPARING POLYURETHANE-BACKED TEXTILES

Larry W. Mobley, and Don H. Kelley, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 16, 1985, Ser. No. 776,320

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—95 **27 Claims**

12. A textile having an adherent polyurethane backing, said backing being prepared from a polyurethane forming composition which comprises:

(A) a first polyol which comprises a relatively high equivalent weight polyol containing an average of about 1.4–1.95 hydroxyl groups per molecule, of which hydroxyl groups at least 30% are primary hydroxyls or a mixture thereof with at least one additional relatively high equivalent weight polyol containing at least 2.05 hydroxyl groups per molecule, of which at least 30% are primary hydroxyls;

(B) a relatively low equivalent weight compound having about 2 active hydrogen containing moieties per molecule;

(C) a polyisocyanate and

(D) a catalytic amount of a catalyst for the reaction of a polyol and a polyisocyanate, wherein the functionalities and proportions of components (A), (B), and (C) are such that such components have an average functionality of about 1.97–2.03, and the composition has an isocyanate index of about 85 to about 125.

4,696,850

IRON-ON INTERLINING COMPOSITE OF KNIT LAYER AND NONWOVEN LAYER OF SIMILAR STRUCTURE

Manfred Jost, Hemsbach; Jurgen Knoke, Weinheim, both of Fed. Rep. of Germany; Zenji Yoshida, Shiga, Japan; Noburo Ohta, and Terumo Nakanishi, both of Sashima, Japan, assignors to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Oct. 20, 1986, Ser. No. 921,228

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3610029

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—197 **16 Claims**

1. A composite interlining comprising:

a first ply of nonwoven fabric having a weight of about 10 to 70 g/m^2; and

a second ply of knit fabric adhered to the first layer, and wherein the knit fabric has a nonwoven fiber structure, a weight of about 10 to 40 g/m^2, a yarn titer of about 12 to 30 dtex at a mesh count of about 60 to 12 wales/cm and about 8 to 26 rows/cm.

4,696,851

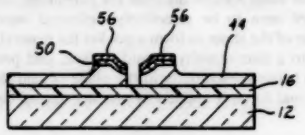
HYBRID AND MULTI-LAYER CIRCUITRY

Michael J. Pryor, Woodbridge, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 715,446, Mar. 25, 1985. This application Dec. 20, 1985, Ser. No. 811,907

Int. Cl.[4] B05D 5/12; B32B 3/00, 7/02

U.S. Cl. 428—210 26 Claims



1. The process of forming a circuit assembly, comprising the steps of:

providing a ceramic substrate;

providing a layer of copper alloy foil having an electrical conductivity of more than about 60% IACS;

providing a polymeric material having a process temperature from about 350° to about 500° C.;

disposing said polymeric material between said layer of copper alloy foil and said ceramic substrate;

heating the assembly of said polymeric material, said layer of copper alloy foil and said ceramic substrate to he process temperature;

pressing the assembly together at a lamination pressure whereby said polymeric material bonds said layer of copper alloy foil to said ceramic substrate; and

forming electrical circuitry in the layer of copper alloy foil.

4,696,852

SPIRAL LINK BELT OF REDUCED AIR PERMEABILITY AND METHOD OF PRODUCING SAME

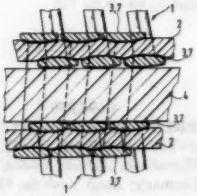
Johannes Lefferts, LM Enschede, Netherlands, assignor to Siteg Siebtechnik GmbH, Ahaus-Alstatte, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 845,143

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511166

Int. Cl.[4] B65G 15/54

U.S. Cl. 428—222 4 Claims



1. A spiral link belt comprising a multiplicity of synthetic resin helices in which the windings of one helix mesh with the windings of the adjacent helices in zipper fashion without any tensile or compressive spring-like stress, pintle wires inserted into channels formed by the meshing windings of each two helices, with the windings of said helices penetrating into the material of the pintle wires, said helices being of oval shape with heads at the windings arcs that are widened in longitudinal direction of the helices, and the interior of said helices is stuffed with filler material, wherein the width of the heads of the winding arcs corresponds to about one and one half to two times the diameter of the wire from which the helices are wound whereby empty space in the central plane of the spiral link belt between adjacent winding heads and the filler material is substantially eliminated.

4,696,853

TEXTILE REINFORCEMENT ADAPTED TO BE USED FOR MAKING LAMINATED COMPLEXES AND PROCESS FOR OBTAINING SAME

André Fourezon, Le Cheylard, France, assignor to Etablissements les Fils d'Auguste Chomarat & Cie, France

Filed Feb. 14, 1986, Ser. No. 829,108

Claims priority, application France, Feb. 22, 1985, 85 02784

Int. Cl.[4] B32B 7/00

U.S. Cl. 428—257 6 Claims

1. A textile reinforcement adapted to be used for making laminated complexes, comprising:

filling yarns extending transversely with respect to the length of said reinforcement;

a loose binding warp interwoven with said filling yarns, the density of said binding warp being less than the density of said filling yarns,

said filling yarns being disposed on a bias with respect to said binding warp,

said binding warp comprising yarns which are superficially thermally fused to said filling yarns, thereby maintaining said bias.

4,696,854

BILAYER SUBSTRATE

Dolores O. Ethier, White Bear Lake, Minn., assignor to Lectec Corporation, Minnetonka, Minn.

Filed Oct. 6, 1986, Ser. No. 915,511

Int. Cl.[4] B32B 27/34

U.S. Cl. 428—287 7 Claims

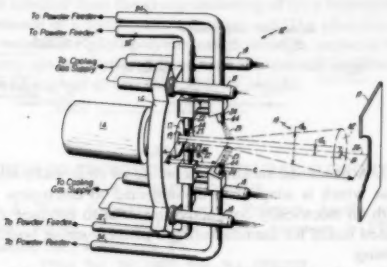
1. An integral bilayer porous non-woven substrate in which one side comprises a fibrous organic polymeric matrix having substantially unaltered surface adhesion characteristics and the second side comprises a cured silicone resin in which said bilayer structure has substantially the equivalent air permeability of the porous substrate alone and the cured silicone layer on said second side exhibits release properties but has substantially no adverse effect upon the adhesion characteristics of said one side, said substrate being formed by (a) the application of said silicone resin in an uncured state to said second side in the absence of significant polar or nonpolar solvent whereby the uncured resin will remain at least temporarily in the vicinity of the second side of the substrate and (b) curing the uncured resin by exposure to a beam of radiation prior to saturation of the matrix by the resin.

4,696,855

MULTIPLE PORT PLASMA SPRAY APPARATUS AND METHOD FOR PROVIDING SPRAYED ABRADABLE COATINGS

Harold W. Pettit, Jr, West Palm Beach; Charles G. Davis, Jupiter, and Frederick C. Walden, Jensen Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 28, 1986, Ser. No. 856,897
Int. Cl.[4] B05D 1/12
U.S. Cl. 428—312.8 6 Claims



1. A method for providing a sprayed powder deposit on a substrate, the deposit characterized by a homogeneous mixture of first and second powder particles, the method comprising the steps of:

(a) generating a high velocity and high temperature stream of gases, and directing the stream of gases onto the substrate, wherein the central portion of the stream is hotter than the outer portion of the stream;

(b) injecting particles of a first powder type into the stream of gases such that they are carried along the central portion of the stream and are impacted upon the substrate;

(c) simultaneously injecting particles of a second powder type into the stream of gases such that the second powder particles are carried along the outer portion of the stream and are impacted upon the substrate without substantial mixing in the stream with the first powder particles; and

(d) moving the stream of gases containing the first and second powder particles relative to the substrate to form a homogeneous powder deposit on the substrate.

4,696,856

PRESSURE-SENSITIVE RECORDING MATERIAL

Yoshio Okada; Nobuo Ahiko, and Yuriko Igarashi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1985, Ser. No. 770,788
Claims priority, application Japan, Sep. 7, 1984, 59-186590; Sep. 20, 1984, 59-197551
Int. Cl.[4] B41M 5/00
U.S. Cl. 428—321.5 19 Claims

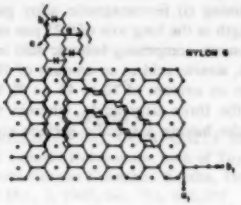
1. A pressure-sensitive recording material comprising a supporting material a face of which is coated with the microcapsules encapsulating minute particles of a pigment dispersed in a solution of an adhesive dissolved in a hydrophobic solvent as a core material of said microcapsules, the size of said particles of the pigment being less than 50 nm and the content of said pigment and said adhesive in the core material being less than 25% by weight and 1.5 to 30% by weight, respectively.

4,696,857

ANNEALED THIN WALLED POLYMER ARTICLES AND METHOD TO ANNEAL

John P. Sibilia, Livingston; Abraham M. Kotliar, Westfield; Narasimhaiah S. Murthy, Belle Mead, and William Sacks, Gillette, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 13, 1985, Ser. No. 808,807
Int. Cl.[4] B32B 5/16; B29B 17/00
U.S. Cl. 428—323 17 Claims



1. A film comprising

a polyamide having a melt index of from 0.01 to 10 g/10 minutes as measured on ASTM D-1238 at 100 gram load at 235° C.;

from 10 to 50 weight percent of a platelet filler wherein the filler has an average equivalent diameter of from 1 to 8 micrometers, a maximum diameter of 25 micrometers, and a thickness of less than 0.5 micrometers, the filler being substantially parallel to the plane of the film, the film being from 10 to 100 micrometers in thickness, wherein the improvement comprises that the film having the platelet filler substantially parallel to the plane of the film was then annealed for from 30 sec to 24 hrs at a temperature greater than the glass transistion temperature of the polyamide.

4,696,858

MAGNETIC RECORDING MEDIUM

Katsumi Ryoke; Nobutaka Yamaguchi; Masatoshi Takahashi; Kazuko Hanai; Hideaki Kosha, and Eiichi Tadokoro, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 18, 1985, Ser. No. 789,221
Claims priority, application Japan, Oct. 19, 1984, 59-218636
The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.
Int. Cl.[4] G11B 5/70
U.S. Cl. 428—323 5 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer being provided on one surface of the support and a backing layer being provided on the surface of the support opposite to said magnetic layer, the backing layer containing (A) a binder comprised of resin having a 100% modulus of 150 kg/cm^2 or less present in an amount of 50 to 95 wt % based on the total weight amount of binder and (B) non-magnetic particles comprised of (i) carbon black having an average particle size of more than 0.1 μm to 1.0 μm, and (ii) carbon black having an average particle size of 0.01 μm to 0.1 μm in a weight ratio of carbon black (i)/carbon black (ii) of 95/5 to 5/95, with the non-magnetic particles in the backing layer being present in an amount of 40 to 300 parts by weight per 100 parts by weight of the total binder.

4,696,859

MAGNETIC RECORDING MEDIUM

Takahito Miyoshi; Nobuo Aoki; Takashi Yoneyama; Akira Kasuga; Toshimitu Okutu; Masaaki Fujiyama, and Yasutoshi Okuzawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 28, 1986, Ser. No. 834,680
Claims priority, application Japan, Feb. 28, 1985, 60-39733
Int. Cl.[4] G11B *5/71, 5/714*
U.S. Cl. 428—323 9 Claims

1. A magnetic recording medium comprising a non-magnetic support having coated thereon a magnetic layer, the magnetic layer containing (i) ferromagnetic alloy particles having an average length in the long axis of 0.25 μm or less and (ii) fatty acid components comprising behenic acid in an amount of 20 to 75 wt %, stearic acid in an amount of 10 to 45 wt % and oleic acid in an amount of 10 to 45 wt % based on the total weight of the three fatty acids, wherein the ferromagnetic alloy particles having a specific surface area of 45 m^2/g or more.

4,696,860

PARTICULATE SPACERS FOR INHIBITING NEWTON RINGS IN TOUCH SENSITIVE OVERLAYS

David L. Epperson, Granite Falls, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Sep. 26, 1985, Ser. No. 780,583
Int. Cl.[4] B32B *19/04, 5/16*
U.S. Cl. 428—325 19 Claims

1. An apparatus in which two spaced-apart light transmitting normally parallel layers of transparent materials are positioned to be held very close to each other locally, with substantial avoidance in the the generation of Newton rings thereby, comprising:

a first layer, of a first transparent material, comprising a first surface and a parallel second surface, whereof said first surface received incident light and transmits a first portion of said light through said first layer and out through said second surface;

a second layer, of a second transparent material, comprising a third surface and a parallel fourth surface, whereof said third surface is located adjacent to and parallel to said second surface of said first layer such as to receive light transmitted therethrough, said second layer transmitting through said fourth surface a second portion of said light received at said third surface; and

fine particles, randomly sized within a predetermined size range, adhered to one of said second surface and said third surface such that the larger of said particles are randomly distributed in a predetermined density and in simultaneous contact with said second surface and said third surface.

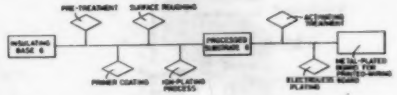
2. An apparatus according to claim 1, wherein: said fine particles comprise glass beads.

4,696,861

SUBSTRATE PROCESSED FOR ELECTROLESS PLATING FOR PRINTED WIRING PATTERN AND PROCESS FOR MANUFACTURING THE PROCESSED SUBSTRATE

Hiromu Tatematsu, and Takeshi Miyabayashi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 666,778, Oct. 31, 1986, abandoned.
This application Sep. 10, 1986, Ser. No. 906,624
Claims priority, application Japan, Nov. 9, 1983, 58-210610
Int. Cl.[4] B32B *5/16*
U.S. Cl. 428—328 9 Claims



1. A processed substrate including an electrically insulating base which is adapted to be subjected to electroless plating with an electrically conductive material to produce a metal-plated board for manufacturing a printed-wiring board, comprising:

a metal oxide film consisting of a large number of fine particles of a reducible metal oxide which are distributed over a surface of said insulating base, said fine particles serving as catalytic cores for the electroless plating of said insulating base with said electrically conductive material, portions of each of said fine particles being embedded in a skin layer of said insulating base adjacent to said surface thereof by bombardment of said fine particles onto the surface of the insulating base, so that said metal oxide film is fixed to the surface of the insulating base, the remaining portions of each of the fine particles being exposed over the surface of the insulating base, said fine particles being absent in the interior of said insulating base.

4,696,862

MAGNETIC RECORDING MEDIUM

Takahiro Kawana, Tagajo, and Norio Yokoyama, Sendai, both of Japan, assignors to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP82/00185, § 371 Date Jan. 12, 1983, § 102(e) Date Jan. 12, 1983, PCT Pub. No. WO82/04158, PCT Pub. Date Nov. 25, 1982
PCT Filed May 21, 1982, Ser. No. 459,602
Claims priority, application Japan, May 22, 1981, 56-77539
Int. Cl.[4] G11B *5/66*
U.S. Cl. 428—336 6 Claims

1. A magnetic recording medium comprising a nonmagnetic base, a metal discontinuous layer formed on one major surface of said nonmagnetic base as discrete island shapes and at least the surfaces of which are oxidized, nitrogenated or carbonized, and a metal magnetic layer formed so as to cover completely said discontinuous layer and the portions of said nonmagnetic base which extend between said discrete island shapes.

4,696,863

BIOCAPSULE

Toshihiko Matsushita, Tokyo; Sadao Morishita, Ibaraki; Mikiya Sekine, Warabi, and Shigetoshi Hiraishi, Tokyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,489

Claims priority, application Japan, Aug. 28, 1984, 59-179938; Oct. 4, 1984, 59-209450

Int. Cl.[4] B01J *13/02*

U.S. Cl. 428—402.2 16 Claims

1. A biocapsule comprising an Eumycete and at least one member selected from the group consisting of (1) a hydrophobic substance or a hydrophilic substance and (2) a photohardenable resin and a photopolymerization initiator, captured by said Eumycete and confined therein, said Eumycete containing lipids in an amount of less than 10% by weight.

4,696,864

METHOD OF PROVIDING STRUCTURAL SUPPORT FOR COMPOSITIONS

Thomas A. Ward, Gibsonia; Victor G. Petracca, Apollo, and Timothy Figore, Springdale, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 26, 1985, Ser. No. 759,215

Int. Cl.[4] C09J *5/02;* B32B *27/38, 15/08*

U.S. Cl. 428—413 18 Claims

8. A method of providing a structural support for the insulating char residue derived from a char forming a self-adhering composition on a substrate, comprising:

I. anchoring to the surface of a substrate a multiplicity of fire resistant members, said members protruding from the surface of the substrate;

II. applying said char forming self-adhering composition to the surface of the substrate so as to at least partially encapsulate the protruding fire resistant members.

15. The method of claim 8 wherein the char forming composition is an intumescent curable composition comprising:

(a) an epoxy resin;

(b) a curing agent adapted to cure said epoxy resin; and

(c) an additive component comprising a mixture of materials adapted to provide a source of,

(1) phosphorus,

(2) zinc,

(3) boron, and

(4) an expansion gas upon thermal decomposition.

18. An article according to the method of claim 15.

4,696,865

HOLLOW COPOLYAMIDE ARTICLE

John C. Richardson, St. Louis, Mo., and Morris Salame, Windsor, Conn., assignors to Monsanto Company, St. Louis, Mo.

Filed Apr. 20, 1984, Ser. No. 602,318

Int. Cl.[4] B32B *27/08;* C08G *69/08*

U.S. Cl. 428—474.4 12 Claims

1. A new article of manufacture comprising a hollow, shaped, blow molded article formed of a composition comprising a copolyamide of hexamethylene terephthalamide and hexamethylene isophthalamide, the ratio of terephthalic acid to isophthalic acid used in forming the copolyamide being between about 1.0 to about 1.9, said article having the following barrier properties: oxygen permeability no greater than

$$1.5 \frac{(cc)\ (mil)}{(100\ sq.\ in.)\ (day)\ (atm)},$$

measured at 23° C., 50% relative humidity; water permeability no greater than

$$3.5 \frac{(gm)\ (mil)}{(100\ sq.\ in.)\ (day)},$$

measured at 30° C., and hydrocarbon permeability as measured using heptane no greater than

$$0.2 \frac{(gm)\ (mil)}{(100\ sq.\ in.)\ (day)},$$

measured at 23° C.

4,696,866

FIBER REINFORCED METAL COMPOSITE MATERIAL

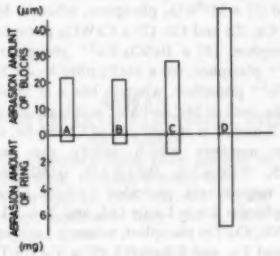
Atsuo Tanaka, and Tadashi Dohnomoto, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Dec. 2, 1985, Ser. No. 803,297

Claims priority, application Japan, Jan. 21, 1985, 60-8894

Int. Cl.[4] B32B *5/02, 15/20;* C22C *1/09;* C22F *1/04;* F01D *5/28*

U.S. Cl. 428—614 6 Claims



1. A fiber reinforced metal composite material having a metal matrix and reinforcing fibers in a volume ratio of t 5 to 15% embedded in said matrix, wherein

said reinforcing fibers consist essentially of at least one member selected from the group consisting of alumina fibers and alumina-silica-type fibers with an average diameter of less than 10 microns, and

said matrix consists essentially of a hypereutectic aluminum-silicon-type alloy containing silicon in an amount of 13 to 30 wt. % in which primary crystal silicon is dispersed.

4,696,867

ALUMINUM BASED BEARING ALLOYS

Barry J. Eastwood, Aylesbury, England, assignor to AEPLC, Rugby, England

Filed Feb. 24, 1984, Ser. No. 583,198

Claims priority, application United Kingdom, Jul. 5, 1983, 8318156

Int. Cl.[4] B32B *15/20*

U.S. Cl. 428—650 11 Claims

1. An alloy consisting essentially of from 3 to 5% by weight particulate silicon of a maximum particle size of 20 microns, from 8 to 20% by weight tin in continuous phase, about 60% of said silicon being incorporated in the tin phase and from 0.2 to 2% by weight copper, the balance being aluminium in continuous phase.

4,696,868

INTENSIFYING SCREENS

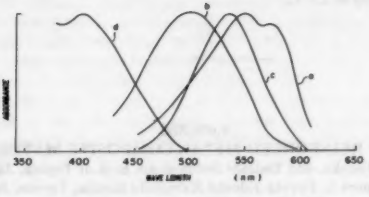
Yuji Aoki, Odawara; Hidenaga Horiuchi; Akio Umemoto, both of Oi, and Norio Miura, Isehara, all of Japan, assignors to Kasei Optonix, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 784,996, Oct. 7, 1985. This application Sep. 29, 1986, Ser. No. 912,515

Claims priority, application Japan, Oct. 17, 1984, 59-216435

Int. Cl.[4] H05B *33/00*

U.S. Cl. 428—690 **9 Claims**



1. An intensifying screen, consisting of: a support, a fluorescent layer on the support and a protective layer on the fluorescent layer, wherein the fluorescent layer is composed essentially of a blue light emitting phosphor selected from the group consisting of (I) a $M^{II}WO_4$ phosphor, wherein M^{II} is at least one of Mg, Ca, Zn and Cd, (2) a $CaWO_4$ phosphor, (3) a $BaSO_4$:Pb phosphor, (4) a $BaSO_4:Eu^{2+}$ phosphor, (5) a (Ba, Sr)$SO_4:Eu^{2+}$ phosphor, (6) a $MeF_2.pMe'X_2.qKX'.rMe''SO_4:mEu^{2+}$, nTb^{3+} phosphor, wherein Me is at least one of Mg, Ca, Sr and Ba, each of Me' and Me'' is at least one of Ca, Sr and Ba, each of X and X' is at least one of Cl and Br, and p, q, r, m and n are numbers which satisfy the conditions of $0.80 \leqq p \leqq 1.5$, $0 \leqq q \leqq 2.0$, $0 \leqq r \leqq 1.0$, $0.001 \leqq m \leqq 0.10$ and $0 \leqq n \leqq 0.05$, respectively, provided $q+r \neq 0$, (7) a LnOX:Tm phosphor, wherein Ln is La or Gd, and X is Cl or Br, (8) a $Ln(Ta_{1-x}, Nb_x)O_4$:Tm phosphor, wherein Ln is at least one of La, Y, Gd and Lu, and $0 \leqq x \leqq 0.3$, (9) a Y_2O_2S:Tb phosphor, (10) a CsI:Na phosphor, (11) a CsI:Tl phosphor, (12) a NaI phosphor, (13) a ZnS:Ag phosphor and (14) a HfP_2O_7:Cu phosphor, and wherein at least one of the fluorescent and protective layers is colored with a colorant which has a main absorption peak at a wavelength in the region of 400 to 600 nm.

4,696,869

MAGNETIC RECORDING MEDIUM

Masaya Funahashi, Osaka; Teruhisa Miyata, Kyoto; Kenichi Inoue, Muko, and Akira Miyake, Kyoto, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Feb. 27, 1986, Ser. No. 833,200

Claims priority, application Japan, Feb. 27, 1985, 60-38355

Int. Cl.[4] G11B *5/71*

U.S. Cl. 428—695 **11 Claims**

1. A magnetic recording medium which comprises a substrate and a magnetic layer formed on at least one surface thereof comprising magnetic powder, a resinous binder and an ester of a polyvalent alcohol with a fatty acid and an ester of a monovalent alcohol with an unsaturated fatty acid.

4,696,870

SOLUTION CIRCULATION TYPE METAL-HALOGEN BATTERY

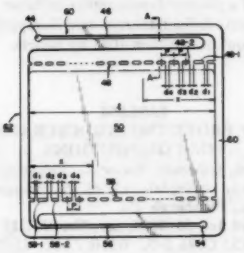
Torahiko Sasaki, Susono; Kazuo Sato, Numazu; Masahiro Ohkawa, Okazaki; Yoshihiro Suzuki, Susono; Masato Kubota, Susono; Hatsuo Nakao, Susono, and Kyoichi Tange, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Mar. 7, 1986, Ser. No. 837,267

Claims priority, application Japan, Mar. 12, 1985, 60-35981[U]; Mar. 25, 1985, 60-42482[U]

Int. Cl.[4] H01M *8/04*

U.S. Cl. 429—14 **8 Claims**



1. A solution circulation type metal-halogen battery in which an electrolyte is circulated between a reaction tank and an electrolyte storage tank, comprising a first group of rectifying plates and a second group of rectifying plates aligned in a row, respectively, provided between the inlet of said electrolyte and said reaction tank and between the outlet thereof and said reaction tank, such as to partition them, the intervals between each of said rectifying plates in said first and second groups of rectifying plates being such as to increase in accordance with a predetermined functional equation in the direction of moving from the inlet or outlet of said electrolyte.

4,696,871

ELECTRICITY PRODUCTION

Alwyn Pinto, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Oct. 14, 1986, Ser. No. 918,580

Claims priority, application United Kingdom, Oct. 22, 1985, 8526055

Int. Cl.[4] H01M *8/06*

U.S. Cl. 429—17 **7 Claims**

1. A process for the production of electricity using a fuel cell wherein

(a) a hydrocarbon-containing feedstock is reacted with steam to produce a hydrogen-containing gas stream at superatmospheric pressure,

(b) the hydrogen-containing gas stream is fed, at superatmospheric pressure, to the anode gas space of a fuel cell,

(c) air at superatmospheric presure is fed to the cathode gas space of the fuel cell, and

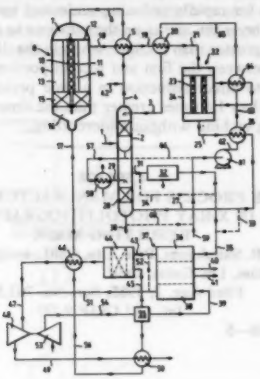
(d) at least the off-gas from the anode gas space of the fuel cell is let down through a turbine driving an air compressor compressing the air required in step (c),

characterised in that

(i) the hydrocarbon-containing feedstock is reacted with steam and with air at superatmospheric pressure supplied by said compressor with the heat required for the endothermic reaction of said feedstock and steam being supplied by the exothermic.reaction of said feedstock and said air, and

(ii) before being let down through said turbine, the off-gas from said fuel cell anode gas space is reacted with com-

pressed air from said compressor to produce a heated waste gas stream and heat is recovered from said waste



gas by heat exchange to preheat at least one of the reactants required in step (i).

4,696,872

PROCESS FOR PRODUCING A CATALYTIC LAYER FOR A FUEL CELL ELECTRODE

Alain P. O. Blanchart, Balen, and Christian J. E. C. Van Der Poorten, Turnhout, both of Belgium, assignors to Electrochemische Energieconversie N.V. (Elenco N.V.), Mol, Belgium

Filed Sep. 3, 1986, Ser. No. 903,221

Claims priority, application Netherlands, Sep. 5, 1985, 8502435

Int. Cl.⁴ H01M *4/88, 4/96*

U.S. Cl. 429—42 **15 Claims**

1. Process for producing a catalytic layer for a fuel cell electrode, characterized in that in a first step at least two carbons or mixtures of carbons are separately mixed with binder, subsequently in a second step these separate carbon/-binder mixtures are intimately mixed together and after that in a third step the mixture obtained is formed into a catalytic layer of the desired dimensions.

4,696,873

RECHARGEABLE ELECTROCHEMICAL CELL WITH A NEGATIVE ELECTRODE COMPRISING A HYDROGEN ABSORBING ALLOY INCLUDING RARE EARTH COMPONENT

Eriko Yagasaki, Tokyo; Motoya Kanda, Yokohama; Kiyoshi Mitsuyasu, Yokohama, and Yuji Sato, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

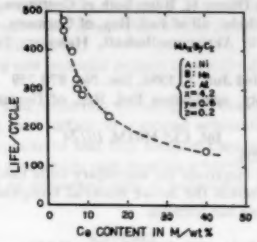
Filed Jun. 11, 1986, Ser. No. 872,844

Claims priority, application Japan, Jun. 21, 1985, 60-133985; Mar. 26, 1986, 61-65877; May 13, 1986, 61-107614

Int. Cl.⁴ H01M *10/52*

U.S. Cl. 429—59 **39 Claims**

1. A rechargeable electrochemical cell comprising a positive electrode, an alkaline electrolyte and a negative electrode made of a hydrogen absorbing alloy containing a rare earth component consisting of a mixture of at least two rare earth elements including Ce; characterized in that the amount of Ce



contained in said hydrogen absorbing alloy is less than 40% by weight relative to the total amount of rare earth elements.

4,696,874

PLUG FOR CELLS OF ELECTRICAL STORAGE BATTERIES

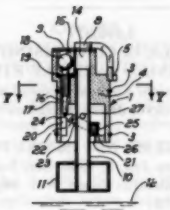
Mario Tadiello, Cassano d'Adda, Italy, assignor to La Batteria di M. Tadiello S.r.l., Cassano d'Adda, Italy

Filed Jun. 23, 1986, Ser. No. 877,300

Claims priority, application Italy, Jul. 3, 1985, 21425 A/85; May 2, 1986, 20284 A/86

Int. Cl.⁴ H01M *2/36*

U.S. Cl. 429—64 **10 Claims**



1. A plug for cells of electrical storage batteries with centralized in-series self-levelling of the electrolyte, which comprises:

a cylindrical body fastened to the vent stack of a cover, and provided with water feed and discharge pipes;

a first central longitudinal duct through said cylindrical body;

a water feed chamber provided laterally of said central duct;

a second lateral duct parallel to the first duct, placing said feed chamber in communication with the electrolyte;

a hollow stem, affixed at one end thereof to a hollow float, sliding in the interior of the central duct;

a rod sliding in the interior of the lateral duct;

a sphere supported by said rod and sliding in the interior of the water feed chamber, and

a rocker element linking the hollow stem to the lateral rod, so that to the moving downwards of the stem, the moving upwards of the rod corresponds, and vice-versa.

4,696,875

POSITIVE ELECTRODE FOR ALKALINE STORAGE CELLS

Oskar Glemser; Dieter H. Buss, both of Gottingen, and Jürgen Bauer, Hildesheim, all of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jun. 4, 1986, Ser. No. 870,759

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520108

Int. Cl.[4] H01M *10/24*

U.S. Cl. 429—206 16 Claims

1. A positive electrode for secondary cells having alkaline electrolytes, wherein the active material comprises a double hydroxide having the formula

$$[M^{2+}_{(1-x)}Fe^{3+}_{x}(OH)_2]^{x+}[(x/n)X^{n-}\cdot yH_2O]^{x-}$$

wherein x is in the range $0.05 \leqq x \leqq 0.4$

wherein the M^{2+} is an oxidizable and reducible cation, and wherein X^{n-} is at least one anion.

4,696,876

PHOTOPOLYMERIZABLE COMPOSITION

John J. Cael, Shrewsbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 12, 1986, Ser. No. 862,022

Int. Cl.[4] G03C *1/70, 9/08;* G03G *1/04*

U.S. Cl. 430—1 23 Claims

14. The method of forming a photopolymer image which comprises imagewise exposing a photopolymerizable alkaline composition comprising an ethylenic unsaturated monomer, a dye sensitizer and a linear polyethylenimine to light absorbed by said dye sensitizer, said dye sensitizer and said linear polyethylenimine providing a photopolymerization system, thereby affecting imagewise photopolymerization of said monomer.

16. The method of claim 14 wherein said ethylenic unsaturated monomer is a monovalent salt of acrylic acid.

17. The method of claim 16 wherein said ethylenic unsaturated monomer is lithium acrylate.

18. The method of claim 17 wherein said photopolymerizable composition includes poly-N-vinyl pyrrolidone.

19. The method of claim 18 wherein said photopolymerizable composition is a coated layer on a support.

4,696,877

PHOTO-MASK BLANK COMPRISING A SHADING LAYER HAVING A VARIABLE ETCH RATE

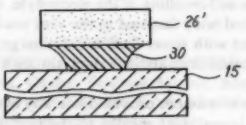
Shigekazu Matsui; Kenichi Kägaya; Masao Ushida, and Kouichi Maruyama, all of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan

Division of Ser. No. 552,156, Nov. 15, 1983, Pat. No. 4,563,407. This application Jan. 6, 1986, Ser. No. 816,213

Claims priority, application Japan, Nov. 16, 1982, 57-199786; Nov. 16, 1982, 57-199787

Int. Cl.[4] G03F *9/00*

U.S. Cl. 430—5 6 Claims



1. A photo-mask blank for use in a lithography technique, comprising a transparent substrate member having a principal surface and a shading layer of chromium having a first surface in contact with said principal surface and a second surface opposite said first surface, said shading layer comprising:

a first portion which is adjacent said principal surface and which provides said first surface, said first portion having a first etch rate; and

a second portion which is farther from said first surface than said first portion and which provides said second surface, said second portion having a second etch rate lower than first etch rate to provide in combination therewith a means for rapidly reducing undesired spots of the chromium layer remaining on the substrate to a number which is not greater than $0.1/cm^2$ wherein the difference in etch time between the first and second portions is sufficiently great to effect reduction in a time period which is not more than 1.4 times greater than the time period for producing etching without undercutting.

4,696,878

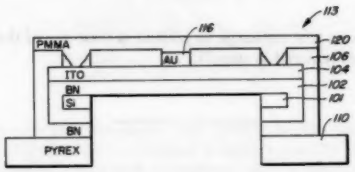
ADDITIVE PROCESS FOR MANUFACTURING A MASK FOR USE IN X-RAY PHOTOLITHOGRAPHY AND THE RESULTING MASK

Alexander R. Shimkunas, Palo Alto, Calif., assignor to Micronix Corporation, Los Gatos, Calif.

Filed Aug. 2, 1985, Ser. No. 762,583

Int. Cl.[4] G03F *9/00*

U.S. Cl. 430—5 3 Claims



1. In a process for manufacturing a mask, the process steps of:

providing an x-ray transparent visible light transparent plating base comprising indium tin oxide:

providing a layer of a first material on said plating base, said first material being x-ray transparent, said first material comprising boron nitride;

removing portions of said first material, thereby exposing portions of said plating base, the remaining portions of said first material serving as a stencil layer; and

plating a layer of x-ray opaque material on said exposed portions of said plating base, wherein said step of removing portions comprises the steps of forming resist over said first material, said resist comprising photoresist or E-beam resist, patterning said resist, and transferring said pattern in said resist to said first material.

4,696,879

METHOD FOR EXPOSING A COLOR TRI-CATHODE RAY TUBE PANEL TO FORM THREE SEPARATE COLOR PHOSPHOR STRIPE PATTERNS BY EXPOSURE FROM THREE SEPARATE LIGHT SOURCE POSITIONS USING COMBINATION OF CORRECTIVE LENSES

Jun Yamazaki, and Yukio Ito, both of Aichi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 10, 1984, Ser. No. 659,421

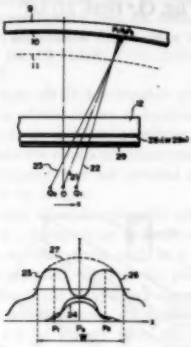
Claims priority, application Japan, Oct. 14, 1983, 58-192095

Int. Cl.[4] G03C *5/00;* B05D *5/06;* G03B *41/00*

U.S. Cl. 430—24 2 Claims

1. A method for exposing a tri-color cathode ray tube having a panel, wherein plural positions of each exposure light source are exposed to a prescribed stripe width using transmission light intensity distribution with superposition of plural Fresnel diffraction waveforms, comprising the steps of selecting a common correction lens and a first correction lens for an exposure at a first light source position, selecting the common correction lens and a second correction lens for an exposure from a second light source position and selecting the common correction lens and a light intensity correction filter for an exposure at a third light source position and said third light

source position is centered between said first and second light source positions, and wherein the absolute value of the transmission light intensity distribution or amount of exposure and the derivative I/x of the transmission light intensity distribution or exposure amount at positions corresponding to edge of the strips width are optimized throughout the inside surface of



the panel, exposing a first color stripe from said first light source position developing said first color stripe, exposing a second color stripe from said second light source position, developing said second color stripe, exposing a third color stripe from said third light source position and developing said third color stripe.

4,696,880

METHOD AND APPARATUS FOR REPRODUCING MULTI-COLOR IMAGE AND PHOTORECEPTOR THEREOF

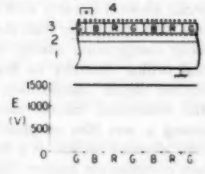
Hisashi Shoji; Satoshi Haneda, and Seiichiro Hiratsuka, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Sep. 4, 1985, Ser. No. 772,651

Claims priority, application Japan, Sep. 6, 1984, 59-185439; Sep. 6, 1984, 59-185440; Sep. 6, 1984, 59-187044; Sep. 6, 1984, 59-198127

Int. Cl.[4] G03G *13/01, 13/22*

U.S. Cl. 430—42 **12 Claims**



1. A method for reproducing a multi-colored image comprising

1. providing a photoreceptor having a photoconductive layer on a conductive member and an insulating layer including a filter layer having groups of fine-fibers distributed therein, each of said groups being capable of passing a specific color, said insulating layer on said photoconductive layer,
2. charging said photoreceptor with a charging means whereby a first substantially uniform charge is placed thereon,
3. imagewise exposing the surface of said photoreceptor in the presence of an alternating current or a charge opposite to said uniform charge,
4. uniformly exposing said surface with light corresponding to said specific color, whereby a potential pattern is formed on portions of said photoreceptor corresponnding to said specific color,
5. developing said potential pattern by a toner of appropriate color,
6. repeating said uniformly exposing said developing, and
7. subjecting said surface to a second substantially uniform charge opposite to said first uniform charge, before said uniformly exposing in said repating whereby deposition of said toner on unwanted areas is minimized.

4,696,881

MEMBER HAVING LIGHT RECEIVING LAYER WITH SMOOTHLY CONNECTED INTERFACES

Keishi Saitoh, Ibaraki; Tetsuo Sueda, Chofu; Kyosuke Ogawa, Sakurashinmachi; Teruo Misumi, Kawasaki; Yoshio Tsuezuki, Toride, and Masahiro Kanai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1985, Ser. No. 752,920

Claims priority, application Japan, Jul. 10, 1984, 59-141306; Jul. 11, 1984, 59-142123; Jul. 12, 1984, 59-143295; Jul. 16, 1984, 59-146112; Jul. 17, 1984, 59-146970; Jul. 18, 1984, 59-150189; Jul. 19, 1984, 59-148650; Jul. 20, 1984, 59-149659; Jul. 23, 1984, 59-151378; Oct. 24, 1984, 59-222227; Oct. 25, 1984, 59-223021; Oct. 26, 1984, 59-224040; Oct. 27, 1984, 59-225109; Oct. 29, 1984, 59-225985; Oct. 30, 1984, 59-226665

Int. Cl.[4] G03G *5/085*

U.S. Cl. 430—57 **98 Claims**

1. A light-receiving member comprising a substrate and a light-receiving layer of a multi-layer structure having at least one photosensitive layer and a surface layer comprising an amorphous material containing silicon atoms and carbon atoms, said light-receiving layer having at least one pair of non-parallel interfaces within a short range and said non-parallel interfaces being arranged in a large number in at least one direction within the plane perpendicular to the layer thickness direction, said nonparallel interfaces being connected to one another smoothly in the direction in which they are arranged.

4,696,882

MEMBER HAVING LIGHT RECEIVING LAYER WITH SMOOTHLY INTERCONNECTING NONPARALLEL INTERFACES

Keishi Saitoh, Ibaraki; Tetsuo Sueda, Chofu; Kyosuke Ogawa, Tokyo; Teruo Misumi, Kawasaki; Yoshio Tsuezuki, Toride, and Masahiro Kanai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1985, Ser. No. 753,011

Claims priority, application Japan, Jul. 12, 1984, 59-143294; Jul. 13, 1984, 59-144387; Jul. 16, 1984, 59-146110; Jul. 17, 1984, 59-146968; Jul. 18, 1984, 59-150187; Jul. 19, 1984, 59-148651; Oct. 22, 1984, 59-220377; Oct. 23, 1984, 59-221257; Oct. 24, 1984, 59-222225; Oct. 25, 1984, 59-223019; Oct. 26, 1984, 59-224038; Oct. 27, 1984, 59-225107

Int. Cl.[4] G03G *5/085*

U.S. Cl. 430—57 **56 Claims**

1. A light receiving member comprising a substrate and a light-receiving layer of a multi-layer structure having a first layer comprising an amorphous material containing silicon atoms and germanium atoms and a second layer comprising an amorphous material containing silicon atoms and exhibiting photoconductivity provided successively from the substrate side, said light-receiving layer having at least one pair of non-parallel interfaces within a short range and said non-parallel interfaces being arranged in a large number in at least one direction within the plane perpendicular to the layer thickness direction, said non-parallel interfaces being connected to one another smoothly in the direction in which they are arranged.

4,696,883

MEMBER HAVING LIGHT RECEIVING LAYER WITH SMOOTHLY CONNECTED NON-PARALLEL INTERFACES AND SURFACE REFLECTIVE LAYER

Keishi Saitoh, Ibaraki; Tetsuo Sueda, Chofu; Kyosuke Ogawa, Tokyo; Teruo Misumi, Kawasaki; Yoshio Tsuezuki, Toride, and Masahiro Kanai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1985, Ser. No. 753,048

Claims priority, application Japan, Jul. 9, 1984, 59-140723; Jul. 10, 1984, 59-141305; Jul. 11, 1984, 59-142122; Jul. 13, 1984, 59-144388; Jul. 16, 1984, 59-146111; Jul. 17, 1984, 59-146969; Jul. 18, 1984, 59-150188; Jul. 19, 1984, 59-148649; Jul. 20, 1984, 59-149658; Oct. 23, 1984, 59-221258; Oct. 24, 1984, 59-222226; Oct. 25, 1984, 59-223020; Oct. 26, 1984, 59-224039; Oct. 27, 1984, 59-225108; Oct. 29, 1984, 59-225984

Int. Cl.[4] G03G 5/085

U.S. Cl. 430—57 94 Claims

1. A light-receiving member comprising a substrate and a light-receiving layer of a multi-layer structure having at least one photosensitive layer and a surface layer having reflection preventive function provided successively from the substrate side, said light-receiving layer having at least one pair of non-parallel interfaces within a short range and said non-parallel interfaces being arranged in a large number in at least one direction within the plane perpendicular to the layer thickness direction, said non-parallel interfaces being connected to one another smoothly in the direction in which they are arranged.

4,696,884

MEMBER HAVING PHOTOSENSITIVE LAYER WITH SERIES OF SMOOTHLY CONTINUOUS NON-PARALLEL INTERFACES

Keishi Saitoh, Ibaraki; Masahiro Kanai, Tokyo; Tetsuo Sueda, Chofu; Teruo Misumi, Kawasaki; Yoshio Tsuezuki, Toride, and Kyosuke Ogawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,516

Claims priority, application Japan, Feb. 27, 1984, 59-35700; Feb. 28, 1984, 59-36903; Mar. 6, 1984, 59-43495

Int. Cl.[4] G03G 5/085

U.S. Cl. 430—58 46 Claims

1. A light-receiving member comprising a light-receiving layer of a multi-layer structure having at least one photosensitive layer on a substrate, said light-receiving layer having at least one pair of non-parallel interfaces within a short range and said non-parallel interfaces being arranged in a large number in at least one direction within the plane perpendicular to the layer thickess direction, each of said non-parallel interfaces being smoothly continuous in the direction in which they are arranged and wherein said at least one pair of non-parallel interfaces has a cycle length (l) $\leqq$ the spot size of incident light and the difference in thickness of the layer between the non-parallel interfaces at said cycle l, is $\geqq \lambda/2_n$ wherein λ is the wavelength of said incident light and n is the refractive index of said layer, whereby the tendency of said layer to form interference fringes is suppressed since the direction of said incident light reflected from one of said interfaces of said light-receiving layer is different from the direction of light emitted by the reflection of said incident light from the other of said interfaces.

4,696,885

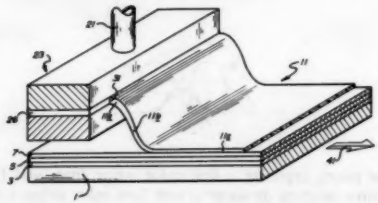
METHOD OF FORMING A LARGE SURFACE AREA INTEGRATED CIRCUIT

Meera Vijan, Troy, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Continuation of Ser. No. 735,268, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 529,436, Sep. 6, 1983, abandoned. This application May 9, 1986, Ser. No. 861,756

Int. Cl.[4] H01L 21/312

U.S. Cl. 430—311 41 Claims



1. A method of forming an electronic circuit element comprising the steps of:

(1) depositing a photoresist layer atop a surface of the element to be subsequently processed by:

a. forming a viscous liquid comprising photoresist and solvent separate from the electronic circuit element surface;

b. forcing the viscous liquid through an elongate, horizontal orifice less than 50 microns thick and in close proximity to but spaced from the electronic circuit element surface to form a flexible, substantially continuous viscous web thereof less than 50 microns thick and capable of maintaining its form and integrity between the orifice and the electronic circuit element surface;

c. moving the circuit element linearly with respect to the orifice at a linear velocity greater than the linear velocity of the viscous composition issuing from the elongated horizontal orifice whereby to draw down and stretch the viscous liquid composition between the orifice and the electronic circuit element surface, thereby depositing a wet film of photoresist on the electronic circuit element surface at a lesser thickness then the viscous composition issuing from the orifice; and

d. heating the film of photoresist to drive off solvent therefrom, thereby providing a thin, adherent film of photoresist of 0.2 to 2.0 micron thickness on the electronic circuit element surface.

(2) exposing at least portions of the photoresist film to actinic radiation;

(3) developing at least portions of the photoresist film;

(4) removing soluble portions of the photoresist to uncover at least portions of the electronic circuit element surface; and

(5) processing at least portions of the uncovered circuit element surface.

4,696,886

POSITIVE PHOTORESIST COMPOSITION WITH M-HYDROXY-α-METHYLSTYRENE HOMOPOLYMER AND QUINONEDIAZIDE COMPOUND

Makoto Hanabata, Ibaraki; Akihiro Furuta; Seimei Yasui, both of Takarazuka, and Kunihiko Tanaka, Nara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 497,912, May 25, 1983, abandoned. This application Jun. 24, 1985, Ser. No. 748,064
Claims priority, application Japan, May 25, 1982, 57-89482
Int. Cl.[4] G03C 1/60, 1/495
U.S. Cl. 430—192 2 Claims

1. A positive type alkali-developable photoresist composition comprising in admixture an m-hydroxy-α-methylstyrene homopolymer and, as a photo-sensitizer, a quinonediazide compound, wherein the photo-sensitizer and the m-hydroxy-α-methylstyrene homopolymer are present in a ratio of in the range of 1:1 to 1:6 by weight.

2. A positive type alkali-developable photoresist composition comprising in admixture an m-hydroxy-α-methylstyrene homopolymer, a novolak resin, and, as a photo-sensitizer, a quinonediazide compound, wherein the photo-sensitizer component and the sum of the m-hydroxy-α-methylstyrene homopolymer and the novolak resin are present in a ratio in the range of 1:1 to 1:6 by weight with the amount of the m-hydroxy-α-methylstyrene polymer being 11 wt % or more based on the weight of novolak resin.

4,696,887

METHOD FOR FORMATION OF AN IMAGE COMPRISING A HEATING STEP

Kozo Sato; Hiroshi Kitaguchi; Masashi Takeuchi; Masaaki Tsukase, and Masatoshi Kato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 13, 1986, Ser. No. 829,032
Claims priority, application Japan, Feb. 13, 1985, 60-26039
Int. Cl.[4] G03C 5/54, 1/06, 5/26, 1/34
U.S. Cl. 430—203 13 Claims

1. A method for formation of an image which comprises imagewise exposing a heat-developable light-sensitive silver halide material to radiation during or after the imagewise exposure, the heating being carried out in the presence of a compound of general formula (I):

$$X—SO_2(DI) \quad (I)$$

wherein X represents a reducing group capable of reducing a silver salt and capable of being oxidized by heating and in its oxidized state capable of releasing a compound represented by $(DI)—SO_2NH_2$ by reaction with a nucleophilic agent; and (DI) represents a development inhibiting group capable of inhibiting the oxidation reduction reaction of the silver salt and a reducing agent.

13. A method for formation of an image comprising a heating step as claimed in claim 1, said silver halide light-sensitive material contains a compound of general formula (III):

$$(Dye—X')_n—Y' \quad (III)$$

wherein Dye represents a dye residue or a dye precursor residue; X' represents a single bond or a linking group; Y' represents a group capable of yielding a difference of diffusibility of a compound of formula $(Dye—X')_n—Y'$, corresponding to or reversely corresponding to a light-sensitive silver salt in imagewise latent image distribution, or alternatively Y' represents a group capable of releasing Dye and yielding a difference of diffusibility between the released Dye and the compound of formula $(Dye—X')_nY'$; and n is an integer of 1 or 2.

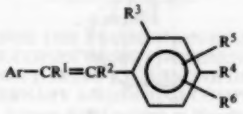
4,696,888

LIGHT-SENSITIVE COMPOUNDS POSSESSING TRICHLOROMETHYL GROUPS, A PROCESS FOR THEIR PRODUCTION AND LIGHT-SENSITIVE MIXTURES CONTAINING THESE COMPOUNDS

Gerhard Buhr, Koenigstein, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 660,098, Oct. 12, 1984, Pat. No. 4,619,998. This application Jul. 30, 1986, Ser. No. 890,537
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1983, 3337024
Int. Cl.[4] G03C 1/495, 1/70; G02B 5/23; F21V 9/04
U.S. Cl. 430—270 9 Claims

1. A light-sensitive mixture comprising (a) a bistrichloromethyl-s-triazine and (b) a compound which is capable of reacting with the photoreaction product of said triazine (a) in such a way that a product is formed that has a light absorption or solubility in developer which is different from that of (b), said triazine (a) having the formula



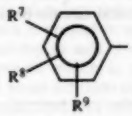
wherein

R^1 and R are each a hydrogen atom or a lower alkyl group,

R^3 and R^4 are different from one another and each is a hydrogen atom or a 4,6-bis-trichloromethyl-s-triazin-z-yl group

R^5 and R^6 are identical or different and each is a hydrogen atom, a halogen atom, an alkyl group having 1 to 3 carbon atoms, or a methoxy group, and

Ar is (i) a mononuclear group having a formula,



wherein R^7, R^8 and R^9 are identical or different and each is a hydrogen atom; a halogen atom; an unsubstituted alkyl group or an alkyl group substituted by halogen, carbocyclic aryl or carbocyclic aryloxy; such that any two of R^7 through R^9 can be connected together to form an ortho-fused 5- or 6-membered ring wherein one or two of the ring carbons can be replaced by an O- or a S-atom; a cycloalkyl group; an alkenyl group; an aryl group; or an aryloxy group, the total number of carbon atoms for R^7, R^8 and R^9 being 12 or (ii) a carbocyclic binuclear or trinuclear group which is unsubstituted or substituted by halogen, an alkyl group having 1 to 3 carbon atoms, an alkoxy group having 1 to 4 atoms, or an alkoxyalkyl group having 3 to 6 carbon atoms.

3. A light-sensitive mixture as claimed in claim 1, wherein said compound (b) contains at least one acid-cleavable C—O—C—bond.

4,696,889

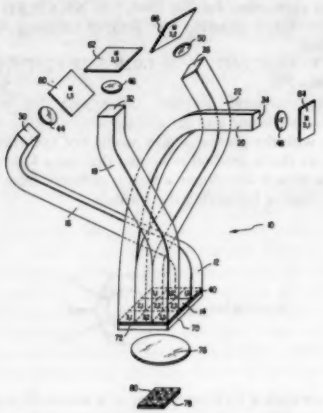
METHOD OF PHOTOFORMING OPTICAL PATTERNS FOR VLSI DEVICES

George J. Yevick, 536 Nordhoff Dr., Leonia, N.J. 07605

Filed Aug. 23, 1985, Ser. No. 768,700
Int. Cl.[4] G03C 5/00
U.S. Cl. 430—311 10 Claims

1. A method of photoforming a composite optical pattern on a photosensitive surface,, the composite pattern being adapted to be optically imaged on said surface, the method including the steps of (a) optically projecting a plurality of original

optical patterns onto at least some of the optical input ends of a plurality of coherent fiber optic sub-bundles, each of said projected original optical patterns being projected onto a responsive one of said input ends, the sub-bundles being bunched together at their other, light output ends to define a trunk of coherent fiber optic bundles, the sub-bundles being separated from each other at their optical input ends, (b) pro-



jecting the original optical patterns exiting from said trunk onto said photosensitive surface, (c) processing said photosensitive surface to thereby produce a composite optical pattern, the composite optical pattern consisting of all of those original optical patterns which were projected through the fiber optic sub-bundles, whereby the composite optical pattern is employed to produce electrical circuits on a single substrate.

4,696,890

PROCESSES FOR PREPARING PROTECTIVE COATINGS AND RELIEF STRUCTURES

Josef Pfeifer, Therwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 28, 1986, Ser. No. 845,892

Claims priority, application Switzerland, Apr. 11, 1985, 1553/85

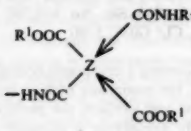
Int. Cl.[4] **G03C** *5/00;* **B05D** *3/06*

U.S. Cl. 430—325 **44 Claims**

1. A process for producing a protecting coating on a substrate which comprises

applying to at least one surface of a substrate a coating of at least one polyamic acid ester which comprises

(a) 50 to 100 mol.%, based on the polyamic acid ester, of at least one recurring structural unit of formula I or II or a mixture thereof,



(I)

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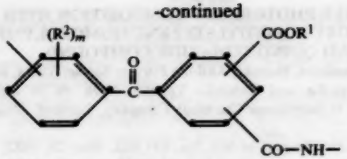
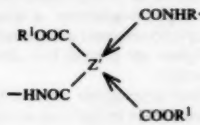


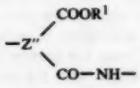
(II)

and

(b) 0 to 50 mol.% of at least one recurring structural unit of formula III or IV or a mixture thereof

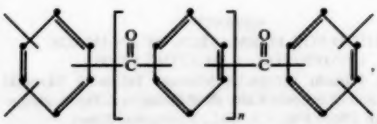


(III)

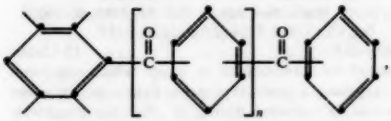


(IV)

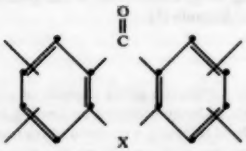
wherein the arrows denote position isomerism, Z is a tetravalent phenyl-aromatic radical having the formula V, VI or VII



(V)



(VI)



(VII)

wherein n is 0 or 1 and X is a direct bond, $—CH_2—$, —O—, —S—, —SO—, $—SO_2—$, $—NR^x—$, $CR^xR^y—$ or —CO—, and the free bonds are located in the ortho-position, R^x is hydrogen or C_1–C_6alkyl, phenyl, benzyl or cyclohexyl, and R^y has the significance of R^x but is not hydrogen,

in which one of the ester groups and one of the amide groups in formula I are attached in the ortho-position either to one phenyl radical or to two different phenyl radicals, and the ester and amide groups in formula II are located in the ortho-position, Z′ is a tetravalent aromatic radical which differs from Z and Z″ is a trivalent aromatic radical which differs from the radical of formula II, wherein one ester group and one amide group are located in the ortho- or peri-position, R is an unsubstituted or substituted divalent organic radical, R^1 is a saturated aliphatic hydrocarbon, and R^2 is a substituent, and m is 0 or an integer from 1 to 4,

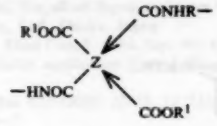
irradiating the coated surface with high energy radiation, and

subsequently converting the polyamic acid ester to the corresponding polyimide by heating.

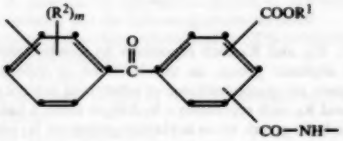
23. A process for producing a photographic relief image on a substrate which comprises

applying to the surface of a substrate a coating of at least one polyamic acid ester which comprises

(a) 50 to 100 mol.%, based on the polyamic acid ester, of at least one recurring structural unit of formula I or II or a mixture thereof,



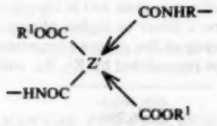
(I)



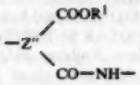
(II)

and

(b) 0 to 50 mol.% of at least one recurring structural unit of formula III or IV or a mixture thereof

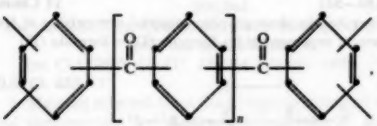


(III)

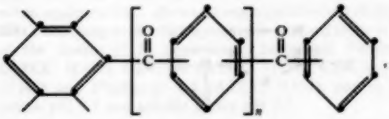


(IV)

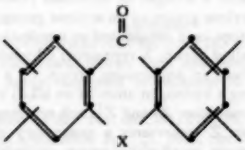
wherein the arrows denote position isomerism, Z is a tetravalent phenyl-aromatic radical having the formula V, VI or VII



(V)



(VI)



(VII)

wherein n is 0 or 1 and X is a direct bond, $—CH_2—$, —O—, —S—, —SO—, $—SO_2—$, $—NR^x—$, $CR^xR^y—$ or —CO—, and the free bonds are located in the ortho-position, R^x is hydrogen or C_1–C_6alkyl, phenyl, benzyl or cyclohexyl, and R^y has the significance of R^x but is not hydrogen,

in which one of the ester groups and one of the amide groups in formula I are attached in the ortho-position either to one phenyl radical or to two different phenyl radicals, and the ester and amide groups in formula II are located in the ortho-position, Z' is a tetravalent aromatic radical which differs from Z and Z'' is a trivalent aromatic radical which differs from the radical of formula II, wherein one ester group and one amide group are located in the ortho- or peri-position, R is an unsubstituted or substituted divalent organic radical, R^1 is a saturated aliphatic hydrocarbon, and R^2 is a substituent, and m is 0 or an integer from 1 to 4,

irradiating the coated surface with high energy radiation through a photomask,

developing the unexposed areas with a solvent or a solvent mixture, and

converting the irradiated polyamic acid ester to the corresponding polyimide by heating.

4,696,891

PROCESS FOR THE PRODUCTION OF NEGATIVE RELIEF COPIES USING PHOTOSENSITIVE COMPOSITION HAVING 1,2-QUINONE DIAZIDE AND QUATERNARY AMMONIUM COMPOUND

Alberto Guzzi, Verona, Italy, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 667,154, Nov. 1, 1984, abandoned. This application Aug. 1, 1986, Ser. No. 892,893

Claims priority, application Italy, Nov. 8, 1983, 23634 A/83

Int. Cl.⁴ G03F *7/08, 7/26*

U.S. Cl. 430—325 **3 Claims**

1. A process for the production of negative relief copies, comprising the steps of

(i) imagewise exposing a photosensitive material uniformly applied as a coating to a support, which material comprises in admixture (a) at least one photosensitive 1,2-quinone diazide which is present in an amount sufficient to impart light-sensitivity to said coating (b) a quaternary ammonium compound which is present in an amount between 0.03 and about 0.5 parts by weight per 1 part by weight of said diazide; and (c) a polymeric binder which is insoluble in water and soluble in aqueous-alkaline solutions, said binder being present in an amount sufficient to stabilize said coating structurally;

(ii) after step (i), heating said photosensitive material at a temperature ranging between about 80° to 120° C. for about 0.5 to 5 minutes; then

(iii) after cooling said coating, uniformly exposing said photosensitive material; and

(iv) after step (iii), developing said photosensitive material by means of an aqueous-alkaline developer, such that areas of said photosensitive material not exposed in step (i) are solubilized.

4,696,892

OPTICAL INFORMATION RECORDING MEDIUM

Michiharu Abe; Masaakira Umehara; Tsutomu Sato; Hideaki Oba; Yutaka Ueda, all of Yokohama, and Makoto Kunikane, Chigasaki, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1985, Ser. No. 706,221

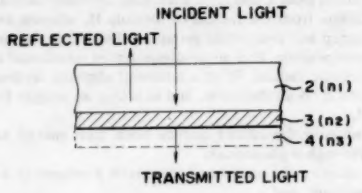
Claims priority, application Japan, Mar. 6, 1984, 59-41240

Int. Cl.⁴ G03C *1/00;* **G01D** *15/10, 9/00*

U.S. Cl. 430—495 **14 Claims**

1. An optical information recording medium having a reflectivity of not less than 16% and an absorptivity of not less than 30%, comprising a transparent substrate having applied thereon a film of an organic coloring material, said organic coloring material being chemically inert to the substrate, wherein information is recorded on said recording medium by the thermal pit-forming action of laser light on said film of said

organic coloring material when said laser light is irradiated through the transparent substrate,
wherein said film of said organic coloring material has:
(a) an extinction coefficient of at least 1,
(b) a film thickness of 200-1,000 Å and
(c) no binder is contained in said film.



11. An optical information recording medium as claimed in claim 1, wherein said recording medium further comprises an underlayer formed between said substrate and said film, said underlayer comprising a layer of Ag or Al and having a thickness of from 0.1–200μ.

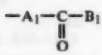
4,696,893

COLOR PHOTOGRAPHIC MATERIAL CONTAINING CERTAIN COMBINATIONS OF CYAN AND MAGENTA COUPLERS

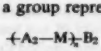
Makoto Umemoto; Kotaro Nakamura, and Nobuo Furutachi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 740,455, Jun. 3, 1985. This application Sep. 30, 1985, Ser. No. 781,603
Claims priority, application Japan, Jun. 1, 1984, 59-112558
Int. Cl.[4] G03C *7/32, 1/40*
U.S. Cl. 430—543 **11 Claims**

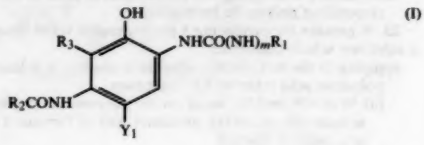
1. A color photographic material comprising a support having thereon (i) a silver halide emulsion layer containing a compound represented by formula (I) or (II), and (ii) a silver halide emulsion layer containing a 5-pyrazolone coupler having an arylthio group at the coupling position of said coupler, wherein said arylthio group includes an aliphatic oxy group or an aromatic oxy group at an ortho-position with respect to the sulfur atom of the arylthio group, the aliphatic group or aromatic group of said aliphatic oxy group or aromatic oxy group being unsubstituted or substituted by at least one member selected from
(a) a halogen atom,
(b) a cyano group,
(c) an unsubstituted or substituted aliphatic, aromatic, or heterocyclic sulfonyl, sulfinyl, or phosphonyl group, and
(d) a group represented by the formula



wherein A_1 represents a single bond, an oxygen atom, a sulfur atom, an imino group, or a divalent aliphatic, aromatic, or heterocyclic group and B_1 represents a hydroxy group, an aliphatic or aromatic oxy group, a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, an unsubstituted or substituted noncyclic amino group, or an unsubstituted or substituted hydrazino group, and
(e) a group represented by the formula

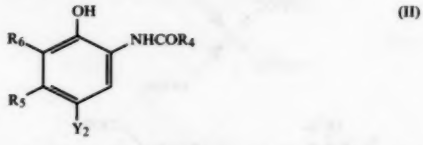


wherein A_2 represents a single bond, a divalent aliphatic, aromatic, or heteropcyclic group, B_2 represents a hydrogen atom, an aliphatic group, an aromatic group or a heterocyclic group, M represents an oxygen atom, a sulfur atom, or an imino group, and n represents an integer of 1 to 4; and formulae (I) and (II) are represented by



(I)

and



(II)

wherein R_1, R_2, and R_4 each represents an unsubstituted or substituted aliphatic group, an unsubstituted or substituted aromatic group, or an unsubstituted or substituted heterocyclic group; R_3 and R_6 each represents a hydrogen atom, a halogen atom, an aliphatic group, or an acylamino group; or R_2 and R_3 together represent a non-metallic atomic group forming a nitrogen-containing 5-membered or 6-membered ring; R_5 represents an unsubstituted or substituted aliphatic group containing at least 2 carbon atoms; Y_1 and Y_2 each represents a hydrogen atom or a group capable of being released during oxidative coupling with a developing agent; and m represents 0 or 1; and said coupler can form a dimer or higher oligomer coupler by linking through a group of the groups represented by R_2, R_3, and Y_1 or the groups represented by R_5, R_6, and Y_2.

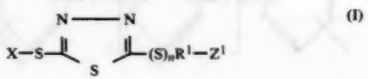
4,696,894

SILVER HALIDE PHOTOGRAPHIC MATERIALS CONTAINING 1,3,4-THIADIAZOLE DERIVATIVES HAVING A POLAR SUBSTITUENT

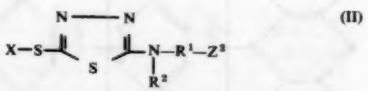
Naoyasu Deguchi; Tetsuro Kojima; Shigeru Ohno; Koki Nakamura, and Hideo Miyazaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 24, 1985, Ser. No. 813,198
Claims priority, application Japan, Dec. 27, 1984, 59-278856
Int. Cl.[4] G03C *1/28, 1/34*
U.S. Cl. 430—551 **11 Claims**

1. A silver halide photographic material comprising at lest one compound represented by formula (I) or formula (II)



(I)



(II)

wherein R^1 represents a straight or branched chain alkylene, alkenylene or aralkylene group, or an arylene group; R^2 represents a hydrogen atom, or a substituted or unsubstituted alkyl, aryl, alkenyl or aralkyl group; X represents a hydrogen atom, an alkali metal atom, an ammonium group, or a precursor capable of providing a hydrogen atom or an alkali metal atom under an alkaline condition; Z^1 and Z^2 each represents a polar substituent, wherein Z^1 represents a quaternary ammonium group, an alkoxy group, an alkylthio group, an arylthio group, a heterocyclic oxy group, a carbamoyl group, a sulfamoyl group, an acyloxy group, a ureido group, a thioureido group, or a sulfonyloxy group; and Z^2 represents a quaternary ammonium group, an alkoxy group, an alkylthio group, an arylthio

group, a heterocyclic oxy group, a heterocylic thio group, a carbamoyl group, a sulfamoyl group, an acyloxy group, a ureido group, a thioureido group, a sulfonyloxy group, a substituted or unsubstituted amino group or a salt thereof, an aryloxy group, a heterocyclic group or a cyano group; and n represents 0 or 1.

4,696,895

MONOCLONAL ANTI-PROTEIN C ANTIBODY, ITS PREPARATION AND USE THEREOF

Tatsuo Yamashita, Kobe; Masafumi Terada, Higashiosaka, and Koji Suzuki, Tsu, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Oct. 9, 1984, Ser. No. 658,560

Claims priority, application United Kingdom, Oct. 18, 1983, 8327860

Int. Cl.[4] G01N *33/53, 33/535, 33/577*

U.S. Cl. 435—7 **8 Claims**

1. A monoclonal anti-human protein C antibody, wherein said antibody has the following characteristics:

(i) molecular weight determined by SDS-polyacrylamide gel electrophoresis:
ca. 192,000

(ii) molecular weight of reduced products by 2-mercaptoethanol:
ca. 26,000 and 46,000

(iii) subclass:
IgG_1

(iv) inhibitory activity toward protein Ca activity:
negative

(v) inhibitory activity toward Factor Va:
positive, and

(vi) antigenic determinant:
binds to the heavy chain of protein C.

4,696,896

GONOCOCCAL PILI PROCESSES FOR THE PREPARATION THEREOF AND THE USE THEREOF FOR THE DETECTION OF AND PREVENTION OF INFECTIONS CAUSED BY *NEISSERIA GONORRHOEAE*

Charles C. Brinton, Pittsburgh, and John C. McMichael, Imperial, both of Pa., assignors to Bactex, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 427,126, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 188,463, Sep. 18, 1980, abandoned, which is a continuation of Ser. No. 571,200, Apr. 25, 1975, abandoned. This application Mar. 19, 1984, Ser. No. 590,544

The portion of the term of this patent subsequent to Jul. 24, 2001, has been disclaimed.

Int. Cl.[4] G01N *33/531, 33/544, 33/569;* **A61K** *39/095*

U.S. Cl. 435—7 **19 Claims**

1. Material selected from the group consisting of single rod and agglomerated rod material derived from *N. gonorrhoeae* pili which is substantially free of cells or cell debris and which, when agglomerated, shows strong agglutination ability against sera containing antibodies against pili derived from at least one of the strains of *N. gonorrhoeae* designated Pittsburgh 3-2 (ATCC 31149), CDCT-2 (ATCC 31150), CDCM-2 (ATCC 31148) and Pittsburgh 4-2 (ATCC 31151), and is insoluble below pH 7.7 and soluble above pH 9.2.

4,696,897

PROCESS FOR PREPARING 2-KETO-L-GULONIC ACID

Takayasu Sonoyama; Shigeo Yagi, and Bunji Kageyama, all of Osaka, Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Continuation of Ser. No. 469,781, Feb. 25, 1983, abandoned. This application Jun. 21, 1985, Ser. No. 747,393

Claims priority, application Japan, Mar. 5, 1982, 57-35455

Int. Cl.[4] C12P *39/00, 7/60*

U.S. Cl. 435—42 **20 Claims**

1. A process for preparing 2-keto-L-gulonic acid from D-glucose, comprising: cultivating in a nutrient medium containing D-glucose a mixed culture of a first microorganism selected from the group consisting of the species *Erwinia citreus, Erwinia punctata, Erwinia terreus* and mutants thereof capable of converting D-glucose into 2,5-diketo-D-gluconic acid and a second microorganism belonging to the genus Brevibacterium or Corynebacterium capable of converting 2,5-diketo-D-gluconic acid into 2-keto-L-gulonic acid wherein said first and second microorganisms are incubated in the medium in such a manner that both microorganisms coexist and grow together therein during at least the latter part of the cultivation.

4,696,898

VECTOR ENCODING HEPATITIS B SURFACE ANTIGEN

Renee A. Fitts, Framingham; Nancy Hsiung, Wellesley, both of Mass., and Dean H. Hamer, Washington, D.C., assignors to Integrated Genetics, Inc., Framingham, Mass.

Filed Jan. 16, 1984, Ser. No. 570,940

Int. Cl.[4] C12P *21/00;* **C12N** *15/00, 5/00, 1/00*

U.S. Cl. 435—68 **11 Claims**

1. A recombinant DNA vector comprising (1) a promoter for a eukaryotic metallothionein gene ligated to a gene sequence encoding human hepatitis B surface antigen, and (2) at least the 69% transforming region of the bovine papilloma virus genome, expression of said hepatitis B surface antigen encoding gene sequence being under the control of said metallothionein promoter.

5. A mammalian cell transformed with a recombinant DNA vector comprising (1) a promoter for a eukaryotic metallothionein gene ligated to a gene sequence encoding human hepatitis B surface antigen, and (2) at least the 69% transforming region of the bovine papilloma virus genome, expression of said hepatitis B surface antigen encoding gene sequence being under the control of said metallothionein promoter.

4,696,899

PROCESS FOR THE PREPARATION OF HUMAN LEUKOCYTE AND HUMAN GAMMA INTERFERON

Miklós Tóth, Szeged; Valéria Endrész, Adony; Ilona Béládi, and Sándor Tóth, both of Szeged, all of Hungary, assignors to EGYT Gyogyszervegyeszeti Gyar, Budapest, Hungary

Filed Dec. 10, 1984, Ser. No. 681,451

Claims priority, application Hungary, Dec. 13, 1983, 4237-83

Int. Cl.[4] C12P *21/00;* **A61K** *45/02*

U.S. Cl. 435—68 **20 Claims**

1. A process for the preparation of alpha-interferon and gamma-interferon one after the other in the same leukocyte culture, which comprises:

(a) isolating the buffy coat fraction of blood,

(b) removing the erythrocytes,

(c) suspending the leukocytes in a suitable nutrient medium,

(d) pretreating said suspension with alpha- or beta-interferon,

(e) then contacting it with an alpha-interferon inducer,

(f) separating the liquid containing the alpha-interferon from the cells,

(g) washing and suspending the cells in a suitable nutrient medium,

(h) treating said cells with a mitogenic agent,

(i) separating the liquid containing gamma-interferon and alpha-interferon from the cells, and

(j) finally recovering gama-interferon from the mixture.

4,696,900

PRODUCTION OF BACTERIAL POLYSACCHARIDES

Derek C. Ellwood, Winterbourne Stoke; Charles G. T. Evans, and Richard G. Yeo, both of Salisbury, all of England, assignors to The Secretary of State for Defence in Her Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation-in-part of Ser. No. 097,449, Nov. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 766,037, Feb. 7, 1977, abandoned, which is a continuation-in-part of Ser. No. 739,145, Nov. 5, 1976, abandoned. This application Jun. 6, 1984, Ser. No. 617,743

Claims priority, application United Kingdom, Nov. 12, 1975, 46784

Int. Cl.[4] C12P *19/06*; C12R *1/64*

U.S. Cl. 435—104 23 Claims

1. A process for the production of a polysaccharide by culturing polysaccharide-producing bacteria of the *Xanthomonas campestris* group in continuous culture, comprising:

(a) introducing into a culture vessel a culture of polysaccharide-producing bacteria of the *Xanthomonas campestris* group;

(b) continuously supplying a culture medium to the culture vessel at a rate such that an essentially steady state is maintained in the vessel;

(c) maintaining conditions of aeration, pH and temperature within the culture vessel, such as to promote the simultaneous growth of bacteria and production of polysaccharides; and

(d) continuously withdrawing the resulting polysaccharide-containing culture broth from the culture vessel at substantially the same rate as the culture medium is supplied to the culture vessel, the said culture medium being a chemically-defined culture medium consisting of the following nutrient sources: a carbon source at a concentration of at least 10 gm liter^{-1} calculated as elemental carbon, a nitrogen source, and sources of further elements, consisting of phosphorus, sulphur, magnesium, potassium and elements other than O, H, C, N, P, S, Mg and K, which are essential for the growth of said polysaccharide-producing bacteria, the sources of said further elements being salts that provide said further elements in the form of inorganic ions in solution;

the medium having a growth-limiting substrate selected from the nitrogen, phosphorus, sulphur, magnesium and potassium source;

and the nutrient sources, the rate of supply of the culture medium to the culture vessel and the conditions within the culture vessel being selected such that the formation of non-polysaccharide-producing strains of Xanthomonas is substantially reduced and thereby a fall-off in polysaccharide yield is substantially avoided.

4,696,901

IMMOBILIZATION OF MICROORGANISMS ON A PLASTIC CARRIER

Brian W. Robertson, and Gareth T. Phillips, both of Sittingbourne, England, assignors to Shell Internationale Research Maatschappij B.V., The Hague and Gist Brocades N.V., Delft, both of, Netherlands

Filed Dec. 7, 1983, Ser. No. 558,749

Claims priority, application United Kingdom, Dec. 23, 1982, 8236719

Int. Cl.[4] C12N *11/08, 11/00, 1/26*

U.S. Cl. 435—180 13 Claims

1. In a process for the immobilisation of one or more hydrocarbon-utilising microorganisms on a plastic carrier in which the immobilisation is carried out in an aqueous nutrient medium, the improvement comprising adding to the nutrient medium from about 0.1–3 ml of a water-immiscible hydrocarbon substrate per 100 cm^2 of plastic carrier surface area.

4,696,902

MODULAR APPARATUS FOR CELL CULTURE

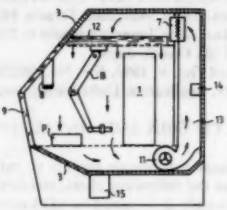
Jean-Claude Bisconte, Paris, France, assignor to Institut National de la Sante et de la Recherche Medicale (INSERM), Paris, France

Filed Jun. 6, 1985, Ser. No. 742,046

Claims priority, application France, Jun. 6, 1984, 84 08839

Int. Cl.[4] C12M *1/18*

U.S. Cl. 435—300 29 Claims



1. A modular apparatus for cell culture, comprising in the same sealed enclosure (2) with isotherms walls (3):

at least one device (1, R, E) for storing culture containers and further comprising a plurality of modules forming shelving (R) provided with selaed compartments (16) containing said culture containers (4*a*);

a temperature regulation device (7);

a closed circuit laminar flow sterilization device (11, 12, 13, 14), including a filter which sterilizes gas flow by removing microbes;

a device for supplying and regulating respiratory gases, said enclosure containing at least one additional device for carrying out a cell culture operation and defining a modular workpost in addition to the modular post corresponding to said storage device (1, R, E), the sealed enclosure also containing at least one automatic and programmable arm (B) which is provided with a handling gripper (21) and which carries out all cell culutre operations corresponding to each of the work posts, and comprising a microprocessor for controlling all cell culture operations.

4,696,903

METHOD AND APPARATUS FOR EXAMINING EARTH FORMATIONS

Murl Owen, Chanute, Kans., assignor to Lalos & Keegan, Washington, D.C.

Filed Dec. 21, 1982, Ser. No. 451,970

Int. Cl.[4] G01N *31/22, 21/01*

U.S. Cl. 436—28 6 Claims

1. A method for examining earth formations in a bore hole for determining the presence of petroleum hydrocarbon comprising the steps of:

illuminating a preselected formation with light having a frequency in the ultraviolet range,

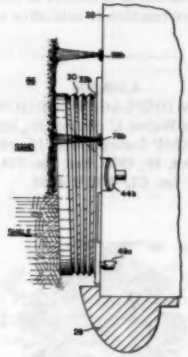
producing a visual display of the color characteristic of light selected from the illuminated formation,

indicating the presence of petroleum hydrocarbons responsive to the presence of a predetermined color content of said visual display,

applying a colorant to the formation being examined, said colorant having the characteristic that it adheres to petroleum hydrocarbon molecules,

illuminating said preselected formation,

producing a visual display of the color characteristic of light reflected from the illuminated formation, and



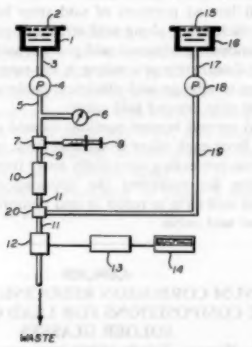
indicating, additionally, the degree of presence of petroleum hydrocarbons responsive to a predetermined intensity of color produced by said colorant in said visual display.

4,696,904

APPARATUS AND METHOD FOR THE DETERMINATION OF WATER BY LIQUID CHROMATOGRAPHY

Timothy S. Stevens, Midland, and Hamish Small, Leland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 24, 1986, Ser. No. 843,423
Int. Cl.[4] G01N *33/18*
U.S. Cl. 436—39 **11 Claims**



1. A method for the determination of water by liquid chromatography comprising the steps of:

adding a predetermined volume of a sample containing a water component and another component to a flowing stream of a nonaqueous eluent;

eluting the sample through a separating medium effective to separate the water component from said another component so that the separated water component emerges from the separating medium in an effluent eluent stream; and

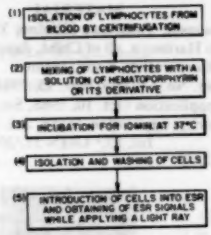
electrochemically detecting the separated water component in the effluent eluent stream from the separating medium in a manner effective to obtain a signal to noise ratio of greater than two.

4,696,905

METHOD FOR DIAGNOSING CANCER USING ESR

Masaaki Aoyama; Mitsuharu Itabashi; Mariko Miura, and Masahiro Kohno, all of Tokyo, Japan, assignors to Special Reference Laboratories, Inc. and JEOL Ltd., both of Tokyo, Japan

Filed May 10, 1984, Ser. No. 608,996
Claims priority, application Japan, May 13, 1983, 58-83651; Dec. 23, 1983, 58-243453; Mar. 27, 1984, 59-58664
Int. Cl.[4] G01N *24/00, 33/48, 33/50*
U.S. Cl. 436—64 **15 Claims**


(1) ISOLATION OF LYMPHOCYTES FROM BLOOD BY CENTRIFUGATION
(2) MIXING OF LYMPHOCYTES WITH A SOLUTION OF HEMATOPORPHYRIN OR ITS DERIVATIVE
(3) INCUBATION FOR 10 MIN. AT 37°C
(4) ISOLATION AND WASHING OF CELLS
(5) INTRODUCTION OF CELLS INTO ESR AND OBTAINING OF ESR SIGNALS WHILE APPLYING A LIGHT RAY

1. A method for diagnosis of cancer in vitro utilizing an ESR spectrometer for quantitative measurements of radicals found in lymphocytes taken from a patient, comprising the steps of:

(a) mixing cells from a patient with a reagent solution, selected from the group consisting of hematoporphyrin and hematoporphyrin derivatives;

(b) isolating the resulting reaction product from unreacted reagent;

(c) irradiating said reaction product with light to generate porphyrin radicals.

(d) obtaining an ESR spectral signal, S_x, of said reaction product indicative of the quantity of radicals contained therein; and

(e) diagnosing the presence or absence of cancer on the basis of value S_x by comparing S_x to S values preestablished to be indicative of cancerous and/or noncancerous states.

4. A method for diagnosis of cancer in vitro utilizing an ESR spectrometer for quantitative measurement of radicals found in lymphocytes taken from a patient, comprising the steps of:

(a) isolating lymphocytes from blood extracted from a patient;

(b) mixing said lymphocytes with a solution selected from the group consisting of hematoporphyrin and hematoporphyrin derivatives;

(c) isolating the resulting reaction product from the mixture;

(d) irradiating said reaction product with light to generate porphyrin radicals,

(e) obtaining ESR spectral signal of said reaction product;

(f) determining a value S_x indicative of the quantity of the radicals contained in said reaction product on the basis of the ESR signal; and

(g) diagnosing for the presence or absence of cancer on the basis of value S_x by comparing S_x to S values preestablished to be indicative of cancerous and/or noncancerous states.

7. A method for diagnosis of cancer in vitro utilizing an ESR spectrometer for quantitative measurement of radicals found in lymphocytes taken from a patient, comprising the steps of:

(a) mixing cells from a patient with a reagent solution, selected from the group consisting of hematoporphyrin; and hematoporphyrin, derivatives;

(b) isolating the resulting reaction product from unreacted reagent;

(c) irradiating said reaction product with light to generate porphyrin radicals,

(d) obtaining ESR spectral signal of said reaction product;

(e) determining the value, S_x, indicative of the quantity of

radicals contained in said reaction product and determining a g-value, g_x, of said radicals on the basis of the ESR signal; and

(f) diagnosing the presence or absence of cancer on the basis of the values S_x and g_x by comparing to S values and a value preestablished to be indicative of cancerous and/or noncancerous states.

4,696,906

TEST MEDIUM SOLUTION FOR DETECTING PHOSPHORUS SEGREGATES IN METALLIC MATERIAL

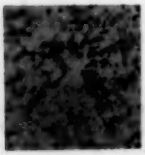
Yoshiko Funahashi; Yoshikazu Kamino; Yasuharu Matsumura, and Senichi Harimaya, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Division of Ser. No. 670,923, Nov. 13, 1984, Pat. No. 4,643,978. This application Oct. 10, 1985, Ser. No. 786,285

Claims priority, application Japan, Jul. 24, 1984, 59-153799

Int. Cl.[4] G01N *33/20*

U.S. Cl. 436—78 **2 Claims**



1. A test medium for use in detecting phosphorus segregates in a metallic material, in the form of an aqueous solution consisting of 0.1 to 80% by weight of silver nitrate in water and alcohol.

4,696,907

IDENTIFICATION OF REAGINS IN THE BLOOD SERUM OF ALLERGEN SENSITIZED VERTEBRATES

John H. Brewer, and Terry L. Foster, both of Abilene, Tex., assignors to Science Research Center, Inc., Abilene, Tex.

Division of Ser. No. 493,413, May 10, 1983, Pat. No. 4,486,540, which is a continuation-in-part of Ser. No. 323,762, Nov. 23, 1981, abandoned, which is a division of Ser. No. 170,143, Jul. 18, 1980, Pat. No. 4,331,650. This application Aug. 30, 1984, Ser. No. 645,665

The portion of the term of this patent subsequent to May 10, 2000, has been disclaimed.

Int. Cl.[4] G01N *33/539, 33/547*

U.S. Cl. 436—513 **8 Claims**

1. A method of determining the presence of absence of a given reagin in the blood serum of a vertebrate sensitized by a polar allergen corresponding to said reagin, which comprises;

A. providing an in-vitro specimen of the blood serum suspected of containing the reagin;

B. providing an aqueous dispersion of solid, non-polar hydrophobic carrier particles having adsorbed thereon a first complex of said polar allergen and a phospholipid compound and a second complex of said allergen and a non-phospholipid compound, said phospholipid and said non-phospholipid compounds both being a compound of the formula: X—Y wherein X represents a hydrophilic, polar moiety and y represents a hydrophobic, non-polar, moiety, said first and second complexes having the formula:

$$(A)X—Y$$

wherein X and Y have the meanings ascribed to them above and (A) is the polar allergen molecule, and wherein X and Y are chemically bound together and the X—Y compound is complexed with the allergen such that the Y moiety is oriented away from the polar allergen molecule;

C. admixing the blood serum provided with the aqueous dispersion; and

D. observing the mixture obtained for an agglutination reaction;

wherein a positive reaction is indicative of the presence of said reagin and a negative reaction is indicative of the absence of said reagin.

4,696,908

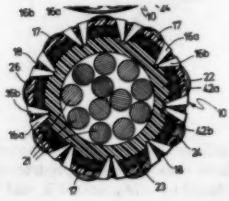
INSULATION DISPLACING GROUND STRAP

David H. Gutter, and Walter C. Shatto, Jr., both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 10, 1986, Ser. No. 918,432

Int. Cl.[4] H01R *4/66*

U.S. Cl. 439—98 **11 Claims**



1. A grounding strap for terminating an outer conductor of an electrical cable, comprising:

an elongated conductive strip having a thickness bent into first bowed portions and second bowed portions,

a plurality of prongs along said strip and projecting outwardly in a common direction from said thickness of said strip,

said strip being deformable into a curved configuration around an electrical cable with said prongs extending toward an outer conductor of said cable to engage conductively said outer conductor upon compression of said strip around said cable.

said first bowed portions of said strip being spaced apart from each other along said strip and positioned between corresponding adjacent said prongs, said first bowed portions of said strip projecting in the same direction as said prongs to engage said electrical cable upon compression of said strip around said cable.

and, said second bowed portions of said strip being spaced apart from each other along said strip, said second bowed portions projecting outwardly away from said first bowed portions for receiving the application of compression against said strip to result in said compression of said strip around said cable.

4,696,909

PLATINUM CORROSION REDUCING PREMELTED OXIDE COMPOSITIONS FOR LEAD CONTAINING SOLDER GLASSES

Edward A. Weaver, Toledo, Ohio, assignor to Owens-Illinois Television Products Inc., Toledo, Ohio

Filed Apr. 7, 1986, Ser. No. 848,551

Int. Cl.[4] C03C *3/072, 8/24*

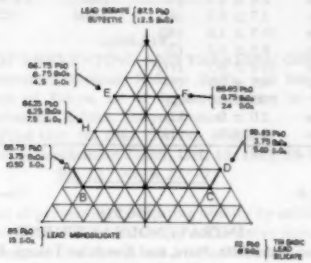
U.S. Cl. 501—75 **4 Claims**

1. A method of making in a platinum melter a Pb_3O_4 free solder glass composition containing PbO and containing at least one of the oxides SiO_2 and B_2O_3, the composition optionally containing one or more of the oxides ZnO, BaO, Al_2O_3 and Bi_2O_3, the method comprising the steps of

(A) providing raw batch ingredients to provide the above solder glass compositions; and

(B) premixing with the raw batch ingredients a premelted oxide composition mixture of PbO and B_2O_3 or a premelted mixture of PbO and SiO_2, or a mixture of PbO,

B_2O_3 and SiO_2, or a mixture thereof, the premelted oxide composition mixture being above the line ABCD of the



ternary diagram of the FIGURE, at least about 50% by weight of the Pb_3O_4 in the raw batch being replaced by the premelted oxide composition.

4,696,910

CATALYST ELEMENT, A PROCESS FOR THE PREPARATION THEREOF AS WELL AS A USE THEREOF

Hans Gustafsson, Lidingö; Stephan Schwartz, Vaxholm, and Karl-Bertil Widén, Åkersberga, all of Sweden, assignors to Electro Cell AB, Åkersberga, Sweden

PCT No. PCT/SE85/00105, § 371 Date Oct. 31, 1985, § 102(e) Date Oct. 31, 1985, PCT Pub. No. WO85/04118, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 8, 1985, Ser. No. 800,597

Claims priority, application Sweden, Mar. 19, 1984, 8401515

Int. Cl.[4] B01J *31/06*

U.S. Cl. 502—159 **24 Claims**

1. A catalyst element for reacting a lyophobic fluid with a lyophilic fluid comprising a porous lyophobic body which has a pore size essentially below 20 μm, a porosity of at least 20% and an exposed surface layer having a thickness of at most 100 μm of lyophilic catalyst particles with a size essentially below 50 μm, across part of its periphery only, said catalyst layer having been formed by sintering and/or pressing the catalyst particles into the porous, lyophobic body.

4. A catalyst element according to claim 1 wherein the lyophobic body is of a polymeric material.

4,696,911

NICKEL BORIDE-POLYMER CATALYST

Hiepke Boerma, Vlaardingen; Rudolph O. de Jongh, The Hague, and Cornelis Van Dijk, Zwijndrecht, all of Netherlands, assignors to Unilever Patent Holdings B.V., Netherlands

Filed Oct. 16, 1986, Ser. No. 919,643

Claims priority, application European Pat. Off., Oct. 18, 1985, 85201708.6

Int. Cl.[4] B01J *31/06*

U.S. Cl. 502—159 **8 Claims**

1. Catalyst composition comprising finely dispersed nickel boride stabilised with a linear polymer containing pyrrolidone groups, in which the composition also contains a partial fatty acid polyol ester in an amount which ranges between 5 and 0.5 times the weight of nickel.

4,696,912

STABILIZED COMPOSITIONS

Allen I. Kay, Succasunna, and Gerard C. Hokanson, Long Valley, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

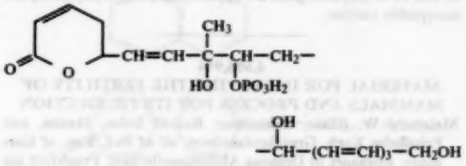
Filed Jan. 10, 1986, Ser. No. 818,504

Int. Cl.[4] A61K *37/16*

U.S. Cl. 514—7 **2 Claims**

1. A stabilized drug composition containing

(a) the compound of the formula



or a pharmaceutically acceptable salt thereof, and

(b) a pharmaceutically acceptable alkali or alkaline earth metal salt or an alkyl ester of ascorbic acid in which alkyl group has one to five carbon atoms, wherein the molar ratio of (a) to (b) is from about 1:0.5 to about 1:6.

4,696,913

NOVEL PEPTIDES WHICH ARE ACTIVE ON THE CENTRAL NERVOUS SYSTEM AND HAVE AN ACTION ON THE CHOLINERGIC SYSTEM

Rolf Geiger, Frankfurt am Main; Hermann Gerhards, Hofheim am Taunus, and Hansjörg Kruse, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 663,193, Oct. 22, 1984, Pat. No. 4,623,715. This application Sep. 2, 1986, Ser. No. 902,615

Int. Cl.[4] A61K *37/02;* **C07K** *5/10, 7/06*

U.S. Cl. 514—15 **4 Claims**

1. A pharmaceutical composition comprising an effective amount of a compound of the general formula I

$$R^4\text{-}A^5\text{-}A^6\text{-}R^7 \qquad (I)$$

in which:

R^4 denotes benzyloxycarbonyl (Z), (C_2–C_6)-alkanoyl, (C_6–C_{10})-aryl-(C_2–C_4)-alkanoyl or cycloalkanoyl with up to 2 alkyl and 5–7 cycloalkyl carbon atoms, bonded via Nα, or

R^3-A^4, in which

A^4 is selected from the group consisting of Ala, Val, Leu, Ile, Met, Ser(C_1–C_6-alkyl), Thr (C_1–C_6-alkyl), Cys(C_1–C_6-alkyl), Phe, C-phenylgycine and Tyr(C_1–C_6-alkyl) and

R^3 represents hydrogen, Z, (C_2–C_6)-alkanoyl, (C_6–C_{10})-aryl-(C_2–C_4)-alkanoyl or cycloalkanoyl with up to 2 alkyl and 5–7 cycloalkyl carbon atoms, bonded via Hα, or

R^2-A^3-A^4, in which

A^4 is as defined above,

A^3 denotes His, Ala, Phe or D-Lys and

R^2 is defined as R^3, or represents (C_2–C_4)-alkanoyl-ω-amino-(C_5–C_8)-n-alkanoyl, methylsulfonyl-ω-amino-(C_5–C_8)-n-alkanoyl, 4-methylsulfonylbenzoyl, succinoyl or glutaroyl, bonded via Hα, or

R^1-A^2-A^3-A^4, in which

A^3 and A^4, are as defined above,

A^2 represents pyroglutamyl, Glu, D-Glu or Ala and

R^1 is defined as R^2, or represents (C_2–C_4)-alkanoyl-ω-amino-C_3–C_4)-n-alkanoyl, methylsulfonyl-ω-amino-(C_3–C_4)-n-alkanoyl, methylamido-glutaroyl, H-Met, H-D-Met, H-Met(O), H-D-Met(O), H-Met(O_2), H-D-

Met (O_2), H-Gly, Z-Gly, H-Tyr, Z-Tyr or pyroglutamyl, bonded via Nα,

A^5 denotes D-Lys or Lys,

A^6 denotes the radical of phenylalanine, N-methylphenylalanine, 4-(C_1–C_4)-alkoxyphenylalanine or 1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid and

R^7 denotes NH-$(CH_2)_n$-NH_2, Gly-NH-$(CH_2)_m$-NH_2, Gly-Lys-R^8 or Gly-D-Lys-R^8, in which n represents an integer from 4 to 10, m represents a integer from 2 to 6 and R^8 represents 1-pyrrolidinyl, 1-piperidinyl, NH-R or NR_2, where R = (C_1–C_4)-alkyl,

or one of its physiological acceptable salts, and a physiological acceptable carrier.

4,696,914

MATERIAL FOR IMPROVING THE FERTILITY OF MAMMALS AND PROCESS FOR ITS PRODUCTION

Meinhard W. Rüsse, Schnaitsee; Rudolf Bolze, Hanau, and Friedhelm Koch, Grosskrotzenburg, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 888,570

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1985, 3527356

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—19 **18 Claims**

1. A process of increasing fertility in a female mammal having a cycle comprising supplying the female mammal with a sufficient amount of L-tyrosine or an alkali metal or alkaline earth metal salt of L-tyrosine, an alkyl ester of L-tyrosine having 1 to 5 carbon atoms in the alkyl group, glycyl-L-tyrosine, an N-fatty acid acyl substituted L-tyrosine having 2 to 22 carbon atoms in the acyl group or N-hydroxmethyl L-tyrosine to increase the fertility of the mammal.

4,696,915

PARATHYMOSIN ALPHA

Bernard L. Horecker, New York, N.Y., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 614,007, May 25, 1984, abandoned. This application Nov. 4, 1985, Ser. No. 794,273

Int. Cl.[4] C07K *15/12;* **A61K** *35/26, 37/24*

U.S. Cl. 514—21 **4 Claims**

1. A peptide of about 105 amino acids having a pI of about 4.15, a partial amino acid sequence at the amino-terminal as follows: X-Ser-Lys-Ser-Glu-Val-Glu-Ala-Ala-Ala-Glu-Leu-Ser-Ala-Lys-Asp-Leu-Lys-Glu-Lys-Lys-Asp-Lys-Val-Glu-Glu-Lys-Ala-Gly-Arg-Lys-

wherein X is a blocking group; said peptide having an amino acid composition as follows:

Asx	13.0 ± 0.8	(13)	Arg.	4.7 ± 0.1	(5)
Thr	2.8 ± 0.1	(3)	Pro	1.8 ± 0.0	(2)
Ser	3.7 ± 0.2	(4)	Total	(105)	
Glx	39.5 ± 1.6	(40)			
Gly	6.5 ± 0.2	(7)			
Ala	10.8 ± 0.5	(11)			
Val	4.5 ± 0.1	(5)			
Ile	0.05 ± 0.01	(0)			
Leu	2.0 ± 0.0	(2)			
Lys	12.5 ± 0.3	(13)			

3. A method for modulating immune response in an animal comprising administering to said animal an immuno-modulating effective amount of a peptide of about 105 amino acids having a pI of about 4.15, a partial amino acid sequence at the amino terminal as follows:

X-Ser-Lys-Ser-Glu-Val-Glu-Ala-Ala-Ala-Glu-Leu-Ser-Ala-Lys-Asp-Leu-Lys-Glu-Lys-Lys-Asp-Lys-Val-Glu-Glu-Lys-Ala-Gly-Arg-Lys-

Wherein X is a blocking group; said peptide having an amino acid composition as follows:

Asx	13.0 ± 0.8	(13)	Arg.	4.7 ± 0.1	(5)
Thr	2.8 ± 0.1	(3)	Pro.	1.8 ± 0.0	(2)
Ser	3.7 ± 0.2	(4)	Total	(105)	
Glx	39.5 ± 1.6	(40)			
Gly	6.5 ± 0.2	(7)			
Ala	10.8 ± 0.5	(11)			
Val	4.5 ± 0.1	(5)			
Ile	0.05 ± 0.01	(0)			
Leu	2.0 ± 0	(2)			
Lys	12.5 ± 3	(13)			

4,696,916

INTRAVENOUS NUTRIENT

Yasunori Yabushita, Nara, and Kunihiko Takagi, Kyoto, both of Japan, assignors to Unitika Ltd., Hyogo, Japan

Filed Aug. 3, 1982, Ser. No. 404,743

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—25 **21 Claims**

21. A process for providing a high calorie nutrient to a patient which comprises intravenously administering to said patient an intravenous nutrient composition containing a fatty acid ester of carbohydrate selected from the group consisting of a monosaccharide, an oligosaccharide, a homopolysaccharide, and a heteropolysaccharide, and water, wherein the amount of the fatty acid ester of carbohydrate is from about 0.001 to about 80% by weight based on the total amount of the fatty acid ester of carbohydrate and water, the fatty acid ester of carbohydrate is dissolved in the water and the fatty acid is at least one fatty acid selected from the group consisting of a saturated fatty acid, an unsaturated fatty acid and a branched-chain fatty acid, said composition being administerable by intravenous injection.

4,696,917

IRRIGATION SOLUTION

Richard L. Lindstrom, 1065 W. Ferndale Rd., Wayzata, Minn. 55391, and Debra L. Skelnik, Box 344, Rte. 5, Cambridge, Minn. 55008

Filed Aug. 1, 1985, Ser. No. 761,407

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—54 **6 Claims**

1. A composition for the irrigation and flushing of body tissue during surgical procedures, which composition comprises effective amounts of:

a. Eagle's Minimum Essential Medium with Earle's salts, without L-glutamine and phenol red, and supplemented with non-essential amino acids;

b. chondroitin sulfate;

c. a buffer system based on N'-2-hydroxyethylpiperazine-N'ethane sulfonic acid;

d. 2-mercaptoethanol; and,

e. a pyruvate.

4. A method of irrigating or flushing body tissue during surgical procedures which comprises bringing the composition of claim 1 into contact with said tissue.

4,696,918

SOLUBILIZED PLATINUM COMPOUND

James F. Stoddart, Sheffield, and David R. Alston, Tonbridge, both of England, assignors to Johnson Matthey Public Limited Company, London, England

Filed Oct. 31, 1985, Ser. No. 793,341

Claims priority, application United Kingdom, Nov. 2, 1984, 8427767; Nov. 16, 1984, 8429030; Feb. 11, 1985, 8503432

Int. Cl.[4] C08G *59/00, 65/08;* **C07F** *15/00*

U.S. Cl. 514—58 **7 Claims**

2. A pharmaceutical composition comprising the inclusion compound of 1,1-cyclobutanedicarboxylatediammine-platinum(II) and α-cyclodextrin in admixture or solution with

an inert, pharmaceutically-acceptable diluent, carrier or solvent.

4,696,919

METHOD OF PREVENTING AND TREATING OBESITY

Yoshikazu Hinohara, Gunma; Rokuro Kaifu, and Isao Matsunaga, both of Tokyo, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

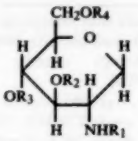
Filed Oct. 10, 1984, Ser. No. 660,421

Claims priority, application Japan, Oct. 13, 1983, 58-192015

Int. Cl.⁴ A61K *31/70*

U.S. Cl. 514—62 **6 Claims**

1. A method of preventing or treating obesity by administering to a patient in need of such therapy as the active ingredient, an effective amount of a compound of the formula



wherein R_1, R_2, R_3 and R_4 are the same or different and are selected from a hydrogen atom or an acetyl group or a pharmaceutically acceptable acid addition salt thereof.

4,696,920

CERTAIN 2-SUBSTITUTED 1,3-PROPYLIDENEDIPHOSPHONATE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND THEIR USE AS ANTIHYPERTENSIVE AGENTS

Craig L. Bentzen, Chavannes-de-bogis, Switzerland; Yves Guyon-Gellin, Annemasse, France; Kyriacos Kalathakis, Grand-Lancy, Switzerland; Hieu T. Phan, Tannay, Switzerland; Lân Nguyen Mong, Nyon, Switzerland; Eric Niesor, Gland, Switzerland, and Jean-Robert Rossier, Grand-Lancy, Switzerland, assignors to Symphar S.A., Le Lignon, Switzerland

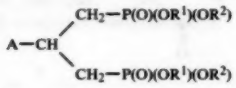
Filed Jul. 16, 1985, Ser. No. 755,712

Claims priority, application Switzerland, Jul. 18, 1984, 3488/84

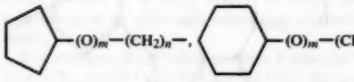
Int. Cl.⁴ C07F *9/58, 9/40;* **A61K** *31/675, 31/66*

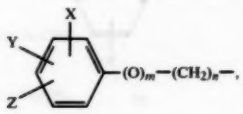
U.S. Cl. 514—89 **29 Claims**

1. 1,3-propylidenediphosphonate derivatives of the formula



wherein R^1 and R^2 are each selected from the group consisting of hydrogen, sodium potassium, magnesium, ammonium, and C_{1-8} alkyl; and A is selected from the group consisting of





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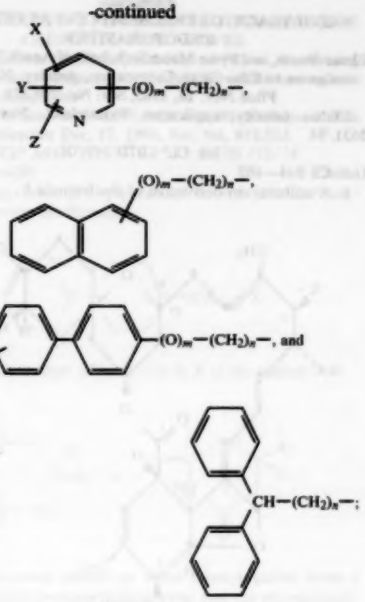


wherein m is zero or 1, n is an integer from zero to 8, and X, Y and Z are each selected from the group consisting of H, F, Cl, Br, I, CF_3, CHF_2, NO_2, CN, CH_3, C_2H_5, CH=CH—CH_2, n-propyl, isopropyl, n-butyl, isobutyl, t-butyl, OH, CH_2OH, —OCH_2O—, OCH_3, OC_2H_5, OC_3H_7, OC_4H_9, SCH_3, NH_2, NMe_2, NEt_2, $(CH_2)_r$—NMe_2, and $(CH_2)_r$—NEt_2 wherein t is an integer from 1 to 4.

23. A method for treating hypertension, comprising administering orally or intravenously to a human in need of a said treatment an anti-hypertensively effective amount of a compound according to claim 1.

4,696,921

ANTIMALARIAL PHARMACEUTICAL COMPOSITIONS

Bernhard Merkli, Frenkendorf, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 331,360, Dec. 16, 1981, abandoned, which is a continuation of Ser. No. 122,645, Feb. 19, 1980, abandoned, which is a continuation of Ser. No. 904,958, May 11, 1978, abandoned. This application Nov. 7, 1983, Ser. No. 549,377

Claims priority, application Luxembourg, May 18, 1977, 77364

Int. Cl.⁴ A61K *31/635, 31/505, 31/47*

U.S. Cl. 514—157 **5 Claims**

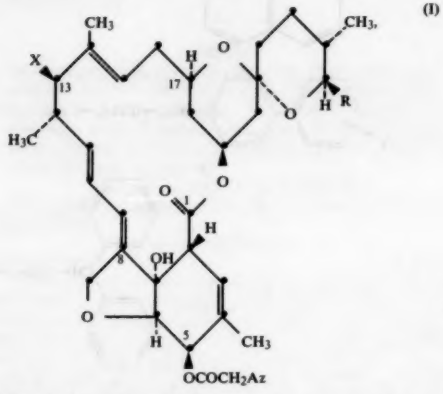
1. An active substance mixture for the treatment or prophylaxis of malaria comprising erythro-α-2-piperidyl-2,8-bis(trifluoromethyl)-4-quinolinemethanol or a pharmaceutically acceptable salt thereof, sulfadoxine and pyrimethamine, in a weight ratio in the range of 10-30:2-20:1.

4,696,922
5-AZOLYLACETOXYMILBEMYCINS AS ECTO- AND ENDOPARASITES

Elmar Sturm, and Peter Maienfisch, both of Aesch, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 18, 1985, Ser. No. 799,373
Claims priority, application Switzerland, Nov. 26, 1984, 5631/84
Int. Cl.[4] C07D *249/08*
U.S. Cl. 514—185 16 Claims

1. A milbemycin derivative of the formula I



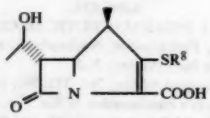
wherein X is hydrogen or β-halogen, R is methyl, ethyl, isopropyl or sec-butyl and Az is a 5 membered heterocyclic aromatic ring which contains 2–4 nitrogen atoms and is attached in the 1-position and which is unsubstituted or substituted by one or two C_1–C_6alkyl groups, or an acid addition salt or metal complex thereof.

4,696,923
6-[1-HYDROXYETHYL]-2-SR[8]-1-METHYL-1-CARBADETHIAPEN-2-EM-3-CARBOXYLIC ACIDS

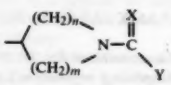
Burton G. Christensen, Cliffside, and David H. Shih, Manalapan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 23, 1984, Ser. No. 603,036
Int. Cl.[4] C07D *487/04;* A61K *31/40*
U.S. Cl. 514—210 4 Claims

1. A compound having the formula:



and pharmaceutically acceptable salts and esters thereof, wherein R^8 is



and wherein n is 1 or 2 and m is 1; X is —NR; and Y is —R; and wherein R is hydrogen or methyl.

4,696,924
METHOD FOR USING DILTIAZEM FOR TREATING STROKE

Frank W. Marcoux, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 818,505, Jan. 10, 1986, Pat. No. 4,654,372.
This application Aug. 6, 1986, Ser. No. 893,841
Int. Cl.[4] A61K *31/55*
U.S. Cl. 514—211 1 Claim

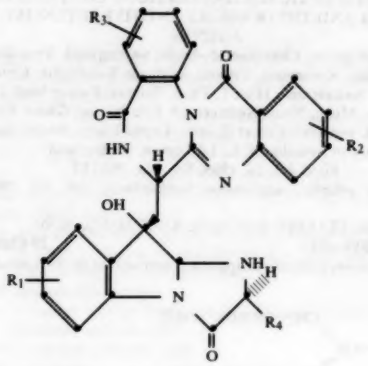
1. A method of use for treating stroke in a subject suffering therefrom comprising administering to said subject diltiazem, in an effective amount for treating stroke in a unit dosage form.

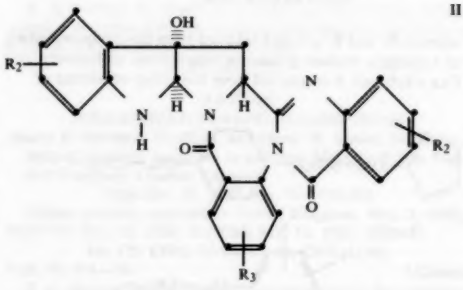
4,696,925
CHOLECYSTOKININ ANTAGONIST COMPOUNDS

David R. Houck, Fanwood; Edward S. Inamine, Rahway, and Michael A. Goetz, Fanwood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jan. 25, 1985, Ser. No. 695,113
Int. Cl.[4] A61K *31/55;* C07D *519/00;* C12P *17/18;* C12R *1/66*
U.S. Cl. 514—219 9 Claims

1. A compound having the formula

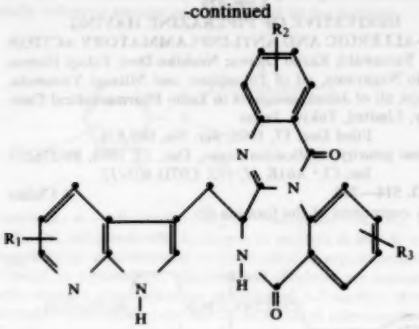




or

-continued

III



and pharmaceutically acceptable salts thereof wherein R_1, R_2, and R_3 are independently selected from H, F, and CH_3 and R_4 is selected from phenyl, cyclohexyl, cyclopentyl, $(CH_3)_2CH—CH_2—$, $(CF_3)(CH_3)CH—CH_2—$, $CH_2=C(CH_3)CH_2—$, $CH_2=CHCH_2—$, $CH_3—CH_2—CH_2—$, $CH_3—CH_2—(CH_3)CH$, $CH_3(CH_2)_3—$, $CH_3—S—(CH_2)_2—$, and $CH_3—CH_2—CH_2—S—CH_2—$ with the proviso that (i) R_1, R_2 and R_3 are all H only when R_4 is other than $(CH_3)_2—CH—CH_2$ and (ii) in structure II R_1, R_2 and R_3 are not all H.

9. A pharmaceutical composition for effecting cholecystokinin inhibition containing a thereapeutically effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

4,696,926

SPIRO MORPHOLINE COMPOUNDS, COMPOSITIONS AND INSECTICIDAL AND NEMATOCIDAL USE

Michael D. Turnbull, Reading, and Ian T. Kay, Penzance, both of England, assignors to Imperial Chemical Industries plc, London, England

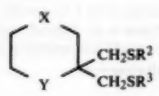
Filed Dec. 12, 1986, Ser. No. 941,101

Claims priority, application United Kingdom, Dec. 19, 1985, 8531284; Dec. 19, 1985, 8531285

Int. Cl.[4] A01N *43/90*; C07D *498/10*

U.S. Cl. 514—230 **8 Claims**

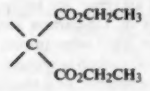
1. A compound of formula (IA):



(IA)

or a salt thereof; wherein one of X or Y is oxygen and the other is NR^1 where R^1 is alkyl, aralkyl or acryl; and R^2, and R^3 together form an optionally substituted methylene group or a bond.

3. A compound according to claim 1 wherein X is oxygen, Y is $>NCH_3$ and R^2 and R^3 together form the group



4,696,927

4-(2-PYRIMIDINYL)-1-PIPERAZINYL HETEROCYCLIC CARBONYL DERIVATIVES

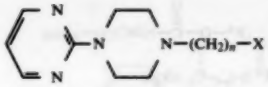
Maurice W. Gittos, Plobsheim, and Marcel Hibert, Strasbourg, both of France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation of Ser. No. 836,277, Mar. 5, 1986, abandoned. This application Dec. 17, 1986, Ser. No. 943,513

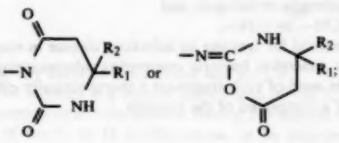
Int. Cl.[4] A61K *31/505, 31/535*; C07D *413/14*

U.S. Cl. 514—236 **8 Claims**

1. A 4-(2-pyrimidinyl)-1-piperazinyl heterocyclic carbonyl derivative having the formula:



wherein n is an integer of from 2 to 5; X is the radical



R_1 and R_2 are each methyl or when taken together form a tetramethylene or pentamethylene ring; and the pharmaceutically acceptable acid addition salts thereof.

7. A method for relieving the symptoms of anxiety in a patient in need thereof, which comprises the administration to said patient of an anxiolytic effective amount of a compound of claim 1.

4,696,928

SUBSTITUTED DIHYDROIMIDAZO[1,2-A]QUINOXALINES

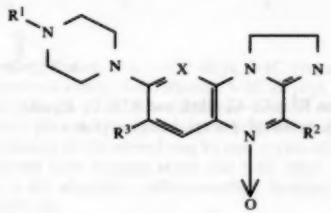
George J. Ellames, High Wycombe, and Albert A. Jaxa-Chamiec, Marlow, both of United Kingdom, assignors to G. D. Searle & Co., Chicago, Ill.

Filed Sep. 9, 1985, Ser. No. 774,218

Int. Cl.[4] C07D *487/04, 487/14*; A61K *31/495*

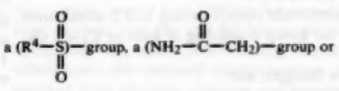
U.S. Cl. 514—250 **18 Claims**

1. A compound of the formula



wherein

R^1 is C_1–C_6 alkyl, benzyl, phenyl, a



a $(R^4—S(=O)_2—$ group, a $(NH_2—C(=O)—CH_2)—$ group or

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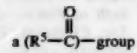
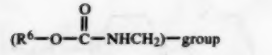


wherein R^4 is C_1–C_6 alkyl, and R^5 is C_1–C_8 alkyl, aminomethyl, pyridinyl, phenyl, halophenyl or a



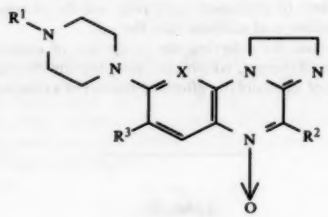
wherein R^6 is C_1–C_6 alkyl;

R^2 is phenyl or substituted phenyl having 1 or 2 substituents selected from the group consisting of halo or C_1–C_6 alkoxy;

R^3 is hydrogen or halogen; and

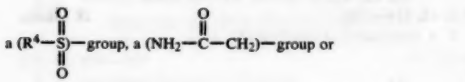
X is =CH— or =N—.

13. A method for treating an infectious disease in mammals caused by anaerobic bacteria comprising administering to a mammal in need of such treatment a therapeutically effective amount of a compound of the formula

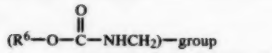


wherein

R^1 is C_1–C_6 alkyl, benzyl, phenyl,



wherein R^4 is C_1–C_6 alkyl, and R^5 is C_1–C_8 alkyl, aminomethyl, pyridinyl, phenyl, halophenyl or a



wherein R^6 is C_1–C_6 alkyl;

R^2 is phenyl or substituted phenyl having 1 or 2 substituents selected from the group consisting of halo or C_1–C_6 alkoxy;

R^3 is hydrogen or halogen; and

X is =CH— or =N—.

4,696,929

DERIVATIVE OF PIPERAZINE HAVING ANTI-ALLERGIC AND ANTI-INFLAMMATORY ACTION

Ichiro Yamawaki; Kazuo Ogawa; Naohiko Ono; Takaji Honna; Sekio Nagayama, all of Tokushima, and Mitsugi Yasumoto, Honjo, all of Japan, assignors to Taiho Pharmaceutical Company, Limited, Tokyo, Japan

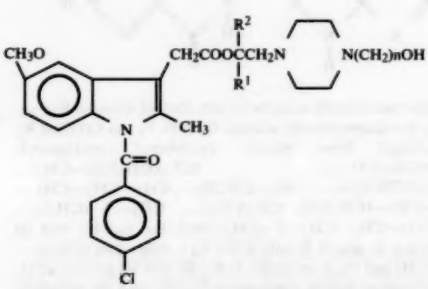
Filed Dec. 17, 1985, Ser. No. 809,876

Claims priority, application Japan, Dec. 27, 1984, 59-276273

Int. Cl.[4] **A61K** *31/495;* **C07D** *403/12*

U.S. Cl. 514—253 **4 Claims**

1. A compound of the formula (I)



(I)

wherein R^1 is lower alkyl or phenyl, R^2 is hydrogen or lower alkyl, and n is an integer of 2 to 10, together with the pharmaceutically acceptable acid salts thereof.

3. A method of treating an inflammatory condition in a patient in need of such treatment, said method comprising administering to said patient an anti-inflammatory effective amount of a compound of claim **1** or a pharmaceutically acceptable acid salt thereof.

4. A method of treating an allergic condition in a patient in need of such treatment, said method comprising administering to said patient an anti-allergic effective amount of a compound of claim **1**, or a pharmaceutically acceptable acid salt thereof.

4,696,930

N-(HETEROARYLALKYL)ACYLANILIDE DERIVATIVES AS ANTIARRHYTHMIC AGENTS

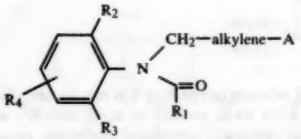
John G. Mullin, Jr., Hawthorne, N.J.; Keiji Nakamura, Kamakura, Japan; Jefferson W. Tilley, North Caldwell, N.J., and Hiroshi Watanabe, Chigasaki, Japan, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 12, 1985, Ser. No. 722,650

Int. Cl.[4] **C07D** *213/56, 239/26, 401/12;* **A61K** *31/44*

U.S. Cl. 514—256 **27 Claims**

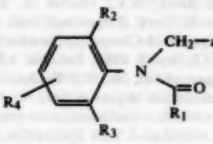
1. A compound of the formula



I

wherein R_1 is —alkylene'—NH_2 or —alkylene'—A'; R_2, R_3 and R_4 are, independently, hydrogen or methyl; A and A' are, independently, unsubstituted or lower alkyl or aryl substituted pyridinyl, or pyrimidinyl; alkylene and alkylene' are independently straight chain alkylene moieties of 1–5-carbon atoms optionally substituted with one or more alkyl substitutents of 1–5 carbon atoms, or when an asymmetric carbon is present, an enantiomer thereof, or a racemic mixture thereof; or a pharmaceutically acceptable salt thereof.

8. A pharmaceutical composition comprising an antiarrhythmically effective amount of a compound of the formula



I

wherein R_1 is —alkylene'—NH_2 or —alkylene'—A'; R_2, R_3 and R_4 are, independently, hydrogen or methyl; A and A' are, independently, unsubstituted or lower alkyl or aryl substituted pyridinyl, or pyrimidinyl; alkylene and alkylene' are independently straight chain alkylene moieties of 1–5 carbon atoms optionally substituted with one or more alkyl substituents of 1–5 carbon atoms or when an asymmetric carbon is present an enantiomer thereof, or a racemic mixture thereof; or a pharmaceutically acceptable salt thereof; and a pharmaceutically inert carrier material.

4,696,931

IMIDAZOLE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Norbert Hauel; Volkhard Austel, both of Biberach; Joachim Heider, Warthausen; Manfred Reiffen, and Willi Diederen, both of Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

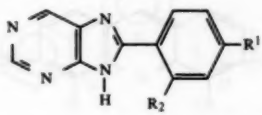
Division of Ser. No. 506,454, Jun. 21, 1983, Pat. No. 4,582,837. This application Apr. 30, 1985, Ser. No. 728,754

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1982, 3224512

Int. Cl.[4] C07D *473/00*; A61K *31/52*

U.S. Cl. 514—261 **7 Claims**

1. A compound of the formula



wherein

R_1 is (alkane of 1 to 3 carbon atoms)sulfonylamino, N-(alkyl of 1 to 3 carbon atoms)-(alkane of 1 to 3 carbon atoms)sulfonylamino, aminocarbonyl, (alkyl of 1 to 3 carbon atoms) amino-carbonyl, di(alkyl of 1 to 3 carbon atoms)amino carbonyl, aminosulfonyl, (alkyl of 1 to 3 carbon atoms) aminosulfonyl, or di(alkyl of 1 to 3 carbon atoms)amino-sulfonyl; and

R_2 is alkoxy of 1 to 3 carbon atoms;

a tautomer thereof; or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,696,932

BIOLOGICALLY-ACTIVE XANTHINE DERIVATIVES

Kenneth A. Jacobson, Silver Spring, Md.; John W. Daly, Washington, D.C., and Kenneth L. Kirk, Bethesda, Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Continuation-in-part of Ser. No. 664,953, Oct. 26, 1984. This application Mar. 29, 1985, Ser. No. 717,616

The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.

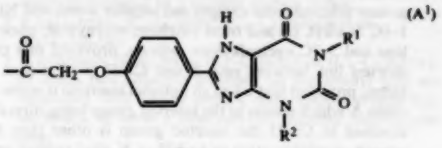
Int. Cl.[4] A61K *31/52*; C07D *473/06*

U.S. Cl. 514—263 **13 Claims**

1. Compounds having the formula:

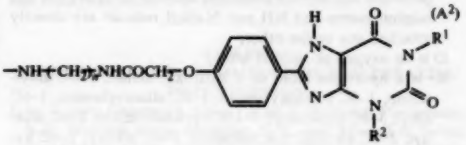
where

A and B are linked together in an amide linkage, and where A (the primary pharmacophore) is:



(A[1])

or



(A[2])

where

R^1 and R^2 are alkyl of 1–6 carbons and n=2–6

and B (the carrier) is a natural amino acid of the L or D configuation or an oligopeptide having 2–5 natural amino acids of the L or D configuration, or an oligopeptide having 1–5 natural amino acids of the L or D configuration in which a 3(2'-thienyl) alanine moiety is bonded through an amide linkage to the terminal amino acid of said oligopeptide, or a 3(2'-thienyl) alanine moiety.

4,696,933

GUANIDINE COMPOUNDS USEFUL AS HISTAMINE H2-ANTAGONISTS

Tobias O. Yellin, Fremont, Calif., and David J. Gilman, Tytherington, United Kingdom, assignors to ICI Americas Inc. and Imperial Chemical Industries PLC, United Kingdom

Division of Ser. No. 353,423, Mar. 1, 1982, Pat. No. 4,496,564. This application Feb. 12, 1985, Ser. No. 701,012

Claims priority, application United Kingdom, Mar. 9, 1981, 8107272

Int. Cl.[4] A01K *31/41*; C07D *249/04, 401/12*

U.S. Cl. 514—275 **9 Claims**

1. A guanidine compound of the formula I:

I

in which

R^1 is a hydrogen atom or a 1–10C alkyl, 3–8C cycloalkyl, 4–14C cycloalkylalkyl, 3–6C alkenyl, 3–6C alkynyl, 1–6C alkanoyl, phenyl, 7–11C phenylalkyl or benzoyl radical, the phenyl, phenylakyl and benzoyl radicals being optionally substituted on the phenyl ring by one or two substituents selected from halogen atoms and 1–6C alkyl, 1–6C alkoxy, 1–6C alkylthio, trifluoromethyl, hydroxy and amino radicals;

in ring X the dotted line is a double bond on one side of the nitrogen atom and Z is a carbon or nitrogen atom such that ring X is a 5-membered aromatic heterocyclic ring which contains at least one nitrogen atom and may optionally contain one or two additional hetero atoms selected from oxygen, nitrogen and sulphur atoms, which heterocyclic ring may, where possible, carry one or two optional substituents, the optional substituents on ring X being selected from fluorine, chlorine and bromine atoms and

1–6C alkyl, 1–6C alkoxy, trifluoromethyl, hydroxy and amino radicals;

A is a phenylene or 5–7C cycloalkylene radical or a 1–8C alkylene chain which is optionally substituted by one or two 1–3C alkyl radicals and into which is optionally inserted, as part of the backbone of the chain, one or two groups selected from oxygen and sulphur atoms and NH, 1–6C N-alkyl, cis and trans vinylene, ethynylene, phenylene and 5–7C cycloalkylene radicals, provided that the shortest link between ring X and C=D is of at least 3 atoms, provided that when an optional insertion is made in chain A which results in the inserted group being directly attached to C=D the inserted group is other than an oxygen or sulphur atom or an NH or N-alkyl radical, and provided that no two insertions selected from oxygen and sulphur atoms and NH and N-alkyl radicals are directly attached one to the other;

D is an oxygen or sulphur atom;

R^2 is a hydrogen atom or a hydroxy, amino, 1–6C alkylamino, 1–6C haloalkylamino, 1–6C alkanoylamino, 1–6C alkyl, 3–8C cycloalkyl, 4–12C cycloalkylalkyl, 2–6C alkenyl, 2–6C alkynyl, 1–6 haloalkyl, 1–6C alkoxy, 1–6C hydroxyalkyl, 2–10C alkoxyalkyl, 2–10C alkylthioalkyl, 1–6C aminoalkyl, 2–8C alkylaminoalkyl, 3–12C dialkylaminoalkyl, 2–8C alkanoylaminoalkyl, 8–14C benzoylaminoalkyl 3–10C alkoxycarbonylalkyl, 2–8C carbamoylalkyl, phenyl, 7–11C phenylalkyl, heteroaryl or heteroarylalkyl radicals, wherein the heteroaryl part is a heterocyclic aromatic ring containing one, two or three heteroatoms selected from oxygen, nitrogen and sulphur atoms, wherein the alkyl part of the heteroarylalkyl radical is 1–6C and wherein, when R^3 is or contains an aryl or heteroaryl ring, that ring is optionally substituted by one or two groups selected from flourine, chlorine, bromine and iodine atoms and 1–6C alkyl, 1–6C alkoxy, 1–6C alkylthio, 2–6C dialkylamino, 2–6C alkanoyl, trifluoromethyl, hydroxy and amino radicals;

R^3 is a hydrogen atom or R^2 and R^3 and the nitrogen atom to which they are attached together form a 5-, 6- or 7-membered saturated ring which optionally contains a double bond, or in which ring one carbon atom is replaced by oxygen, NH or NR wherein R is a 1–6C alkyl radical; provided that when R^1 is a hydrogen atom or an alkyl radical, ring X is a thiazole ring in which A is attached at the 4-position and A is an alkylene chain which has a single optional insertion of a sulphur atom, then NR^2R^3 is other than NH_2, NHOH or NH alkyl: and the pharmaceutically-acceptable acid-addition salts thereof.

8. A pharmaceutical composition which comprises a guanidine compound as claimed in claim **1** in association, in an amount effective to inhibit gastric acid secretion, with a pharmaceutically-acceptable diluent or carrier.

4,696,934

METHOD FOR USING NIFEDIPINE FOR TREATING STROKE

Frank W. Marcoux, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 818,505, Jan. 10, 1986, Pat. No. 4,654,372. This application Aug. 6, 1986, Ser. No. 893,839

Int. Cl.[4] A61V *31/435*

U.S. Cl. 514—277 **1 Claim**

1. A method of use for treating stroke in a subject suffering therefrom comprising administering to said subject nifedipine in an effective amount for treating stroke in a unit dosage form.

4,696,935

METHOD OF TREATING TRANSPLANTED TUMORS AND MODULATING THE IMMUNE RESPONSE

Keith C. Murdock, Pearl River, N.Y.; Martin R. Damiani, Allendale, and Frederick E. Durr, Ridgewood, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 183,612, Sep. 2, 1980, Pat. No. 4,314,061, which is a continuation-in-part of Ser. No. 89,805, Oct. 31, 1979, abandoned, which is a continuation-in-part of Ser. No. 954,279, Oct. 24, 1978, abandoned, which is a continuation-in-part of Ser. No. 821,039, Aug. 1, 1977, abandoned. This application Oct. 27, 1981, Ser. No. 315,559

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—297 **3 Claims**

1. A method of stimulating the immune response in a mammal in need of such stimulation which comprises administering to said mammal an effective immunostimulating amount of a compound selected from the group consisting of 3,6-bis[2-(1-piperidino)ethoxy]acridine and the pharmacologically acceptable acid-addition salts thereof.

4,696,936

3,6-BIS (SUBSTITUTED) ACRIDINE N-OXIDES AND N,N-DIOXIDES AND METHODS OF RESTORING, STIMULATING OR ENHANCING THE IMMUNE SYSTEM WITH THEM

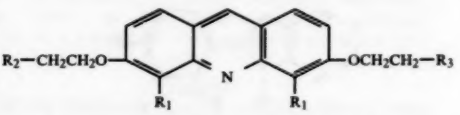
Ralph G. Child; Thomas L. Fields, both of Pearl River, N.Y.; Raymond G. Wilkinson, Montvale, N.J., and Yang-I Lin, Nanuet, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 9, 1984, Ser. No. 669,917

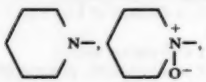
Int. Cl.[4] A61K *31/47*; C07D *219/06*

U.S. Cl. 514—297 **28 Claims**

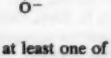
1. A compound of the formula:



wherein R_1 is selected from the group consisting of hydrogen, halogen, hydroxymethyl, formyl, —COOH and alkyl-(C_1–C_3); R_2 and R_3 may be the same or different and are selected from the group consisting of



—N-[alkyl(C_1–C_4)]$_2$ and



with the proviso that at least one of R_2 and R_3 must be in the N-oxide form, and the pharmaceutically acceptable salts thereof.

13. A method of restoring, stimulating or enhancing the immune system in a warm-blooded animal which comprises administering to said animal an effective amount of a compound of the formula as recited in claim **1** and the pharmaceutically acceptable salts thereof.

4,696,937

THIOSULFONATE DERIVATIVES FOR INHIBITING MALFORMATION OR DESTRUCTION OF RED BLOOD CORPUSCULES

Bernard Sebille, Clamart; Yves Beuzard, Paris, and Henri Demarne, Montpellier, all of France, assignors to Sanofi and Institut National de la Sante et de la Recherche Medicale (Inserm), both of Paris, France

Filed Nov. 13, 1985, Ser. No. 797,521

Claims priority, application France, Nov. 13, 1984, 84 17286

Int. Cl.[4] A61K *31/47, 31/415;* **C07D** *401/12, 233/84*

U.S. Cl. 514—314 **8 Claims**

1. A thiosulfonate derivative having a formula:

$$R—S—SO_2—R_1$$

in which R represents a 1H-imidazol-2-yl radical and R_1 represents a lower alkyl, (hydroxy) lower alkyl, phenyl, (lower alkyl) phenyl, (hydroxy lower alkyl) phenyl, (lower alkanoyl) phenyl or quinolin-8-yl radical.

7. Method for inhibiting the malformation or destruction of the red blood corpuscules due to a genetic modification of the haemoglobin or to parasites in a host in need of such inhibitory treatment comprising the administration to the said host of an effective dose of at least one thiosulfonate derivative according to claim 1.

4,696,938

INSECTICIDAL 6-ARYL-PYRIDINE THIOSEMICARBAZONES

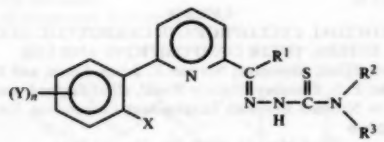
Dat P. Le, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 25, 1986, Ser. No. 856,629

Int. Cl.[4] C07D *401/12;* **A61K** *31/44, 31/445*

U.S. Cl. 514—343 **20 Claims**

1. A compound having the formula



where

R^1 is hydrogen or methyl;

R^2 and R^3 taken together with the nitrogen atom to which they are attached form a 3 to 6 membered heterocycle having 2 to 5 nuclear carbon atoms;

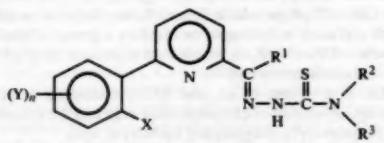
X is halo, nitro, $(C_1–C_4)$alkyl, $(C_1–C_4)$haloalkyl or $(C_1–C_4)$alkoxy;

Y is hydrogen, halo, NO_2, $(C_1–C_4)$alkyl or $(C_1–C_4)$alkoxy; or when two adjacent positions on the phenyl ring are substituted with alkoxy groups, these alkoxy groups may be joined to form a dioxolano or dioxano heterocyclic ring;

n is 0, 1 or 2;

and the agronomically acceptable salts thereof.

13. A method of controlling insects which comprises contacting said insects with an insecticidally effective amount of a compound having the formula



where

R^1 is hydrogen or methyl;

R^2 is $(C_1–C_4)$alkyl;

R^3 is $(C_1–C_4)$alkyl; or

R^2 and R^3 may be taken together with the nitrogen atom to which they are attached to form a 3 to 6 membered heterocycle having 2 to 5 nuclear carbon atoms;

X is halo, nitro, $(C_1–C_4)$alkyl, $(C_1–C_4)$haloalkyl or $(C_1–C_4)$alkoxy;

Y is hydrogen, halo, NO_2, $(C_1–C_4)$alkyl or $(C_1–C_4)$alkoxy; or when two adjacent positions on the phenyl ring are subsituted with alkoxy groups, these alkoxy groups may be joined to form a dioxolano or dioxano heterocyclic ring;

n is 0, 1 or 2;

and the agronomically acceptable salts thereof.

4,696,939

BENZOTHIADIAZOLE COMPOUNDS FOR TREATING HYPERTENSION

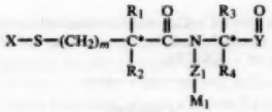
John T. Suh, Greenwich, Conn.; John J. Piwinski, Parsippany, N.J.; Howard Jones, Ossining, N.Y., and Edward S. Neiss, New Canaan, Conn., assignors to USV Pharmaceutical Corporation, Tuckahoe, N.Y.

Division of Ser. No. 584,576, Feb. 29, 1984, Pat. No. 4,576,941. This application Nov. 29, 1985, Ser. No. 802,921

Int. Cl.[4] A61K *31/41;* **C07D** *285/14*

U.S. Cl. 514—361 **11 Claims**

1. A compound of the formula



or a pharmaceutically acceptable salt thereof, wherein

X is hydrogen or

wherein A is C_{1-7} alkyl, phenyl, or phenyl substituted with up to 3 substituents selected from the group consisting of halo, C_{1-7} alkyl, $—CF_3$, —OH, —COOH, $—NH_2$, $—SO_2NH_2$;

m is 0 to 3 inclusive;

Y is —OR or —N(R)R;

R_1, R_2, R_3 and R_4 are independently R or amino-C_{1-7} alkyl;

Z_1, reading toward the M_1 substituent, is selected from the group consisting of $—(CH_2)_n—$, $—N(R)CH_2(CH_2)_n—$, $—N(R)CH_2(CH_2)_nNH—$, $—(CH_2)_nSO_2—$, $—(CH_2)_nN(R)SO_2—$, $—(CH_2)_n—N(R)—$, $—(CH_2)_nN(R)C(O)—$, $—(CH_2)_nC(O)N(R)—$, or $—(CH_2)_nC(O)—$, in which n is 0 to 6 inclusive, and one of the (CH_2) groups can be mono- or disubstituted with methyl or ethyl;

M_1 is benzothiadiazole having two or three substitutents selected from the group consisting of halogen, alkyl, aminoalkyl, aralkyl, cycloalkyl, alkylamino, acylamino, acylaminoalkyl, acylaminoalkylamino, trifluoromethyl, nitro, cyano, —OR, —SR, —C(O)OR, —S(O)R, $—SO_2R$, —C(O)N(R)R, —N(R)R, or $—SO_2N(R)R$;

wherein in each occurrence R is independently hydrogen, alkyl, cycloalkyl, aryl, aralkyl, heteroalkyl, heteroaralkyl, or heteroaryl;

wherein the alkyl groups and moieties have 1 to 7 carbon atoms, and the cycloalkyl, heteroalkyl, aryl and heteroaryl groups and moieties are selected from the group consisting of cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, adamantyl, norbornyl, phenyl, tolyl,

benzyl, phenethyl, indoyl, indolinyl, hydroxybenzyl, indanyl, naphthyl, tetrahydronaphthyl, decanhydronaphthyl, pyridyl, quinolyl, isoquinolyl, guanidino, pyrrolidyl, pyrrolyl, morpholinyl, furyl, furfuryl, tetrahydrofurfuryl, benzimidazolyl, thienyl, imidazolyl, and tetrahydroisoquinolyl.

11. A method of treating hypertension comprising administering to a subject suffering therefrom a compound or salt according to claim 1 in an amount effective to alleviate said hypertension.

4,696,940

METHOD FOR TREATING HYPERTENSION USING 3-(4-IMIDAZOLYLMETHYLENE)-CARBAZIC AND DITHIOCARBAZIC ACID ESTERS

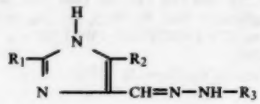
Peter S. Chan, Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 29, 1986, Ser. No. 924,394

Int. Cl.[4] A61R *31/415*

U.S. Cl. 514—400 **9 Claims**

1. A method of treating hypertension in a mammal in need of said treatment which comprises administering to said mammal a hypotensive effective amount of a compound of the formula:



wherein R_1 is alkyl(C_1–C_6), methoxymethyl or benzyl; R_2 is hydrogen or methyl; and R_3 is a moiety of the formula:—$CO_2C_2H_5$ or —CS_2CH_3.

4,696,941

1,8-DIACYLOXY-10-ACYLANTHRONES

Braham Shroot, Antibes; Gérard Lang, Epinay-sur-Seine, and Jean Maignan, Tremblay les Gonesse, all of France, assignors to Groupement d'Interet Economique dit: Centre International 'de Recherches Dermatologiques C.I.R.D., Valbonne, France

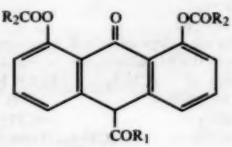
Filed Jun. 28, 1985, Ser. No. 750,088

Claims priority, application France, Jun. 29, 1984, 84 10324

Int. Cl.[4] A01N *35/00*; C07C *50/70, 50/16*

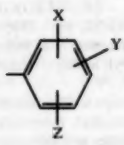
U.S. Cl. 514—423 **8 Claims**

1. A compound of the formula



(I)

wherein R_1 and R_2 are the same or different and represent a straight-chain or branched alkyl group of 1 to 15 carbon atoms, a cycloalkyl group of 3 to 6 carbon atoms, a 2-furyl, 3-furyl, 3-pyridyl, 4-pyridyl or 2-thienyl group or an aromatic group of the formula



wherein X, Y and Z are the same or different and represent hydrogen, alkyl of 1 to 3 carbon atoms, trifluoromethyl, alkoxy with 1 to 4 carbon atoms, halogen, nitro or hydroxy groups.

4,696,942

TREATMENT OF MEMORY IMPAIRMENT USING (R)-ALPHA-ETHYL-2-OXO-1-PYRROLIDINEACETAMIDE

Jean Gobert; Corneliu Giurgea, both of Brussels; Jean-Pierre Geerts, Leglise, and Guy Bodson, Bellefontaine, all of Belgium, assignors to UCB Societe Anonyme, Brussels, Belgium

Filed May 14, 1985, Ser. No. 733,791

Claims priority, application United Kingdom, May 15, 1984, 8412358

Int. Cl.[4] A61K *31/40*

U.S. Cl. 514—424 **1 Claim**

1. A method for treating memory impairment in a patient in need thereof which comprises administering to said patient an effective amount of (R)-alpha-ethyl-2-oxo-1-pyrrolidineacetamide.

4,696,943

(S)-ALPHA-ETHYL-2-OXO-1-PYRROLIDINEACETAMIDE

Jean Gobert, Brussels; Jean-Pierre Geerts, Leglise, and Guy Bodson, Bellefontaine, all of Belgium, assignors to U C B Societe Anonyme, Brussels, Belgium

Filed May 14, 1985, Ser. No. 733,790

Claims priority, application United Kingdom, May 15, 1984, 8412357

Int. Cl.[4] A61K *31/40*

U.S. Cl. 514—424 **1 Claim**

1. A method for achieving an anti-hypoxia and anti-ischemia effect in a patient in need thereof, which comprises administering to said patient an effective amount of (S)-alpha-ethyl-2-oxo-1-pyrrolidineacetamide.

4,696,944

PESTICIDAL CYCLOPROPANE CARBOXYLIC ACID ESTERS, THEIR COMPOSITIONS AND USE

Michael Elliott, Stevenage; Norman F. Janes, Luton, and Bhupinder P. S. Khambay, Harrow Weald, all of England, assignors to National Research Development Corporation, United Kingdom

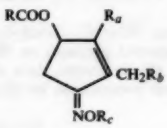
Filed Mar. 14, 1985, Ser. No. 711,812

Claims priority, application United Kingdom, Mar. 15, 1984, 8406731

Int. Cl.[4] A01N *53/00*; C07C *69/743, 131/08*

U.S. Cl. 514—531 **17 Claims**

1. A compound of the formula I



in which formula:

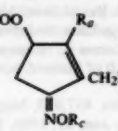
R_a is hydrogen or alkyl of 1 to 6 carbon atoms, and R_c is alkyl of 1 to 6 carbon atoms:

R_b is phenyl unsubstituted or substituted by alkyl of 1 to 6 carbon atoms or halogen, a group of the formula —CH=CR_dR_e in which R_d and R_e are identical or different and each is hydrogen or alkyl or a group of the formula —CH=NOR_f in which R_f is hydrogen or alkyl of 1 to 6 carbon atoms and

RCOO is a residue of an acid RCO_2H selected from the group consisting of chrysanthemic acid and 2,2-dimethyl-3-(dihalovinyl)cyclopropane carboxylic acid.

6. A pesticidal composition useful for controlling pest infes-

tation which comprises a pestically effective amount of a compound of the formula I:



wherein:

R_a is hydrogen or alkyl of 1 to 6 carbon atoms, and R_c is alkyl of 1 to 6 carbon atoms:

R_b is phenyl unsubstituted or substituted by alkyl of 1 to 6 carbon atoms or halogen, a group of the formula $—CH=CR_dR_e$ in which R_d and R_e are identical or different and each is hydrogen or alkyl or a group of the formula $—CH=NOR_f$ in which R_f is hydrogen or alkyl of 1 to 6 carbon atoms and

RCOO is a residue of an acid RCO_2H selected from the group consisting of chrysanthemic acid and 2,2-dimethyl-3-(dihalovinyl)cyclopropane carboxylic acid, in combination with a suitable carrier.

4,696,945

13β-MILBEMYCIN DERIVATIVES FOR CONTROLLING ECTO- AND ENDOPARASITES OF PLANTS AND ANIMALS

Bruno Frei, Liestal, and Anthony C. O'Sullivan, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

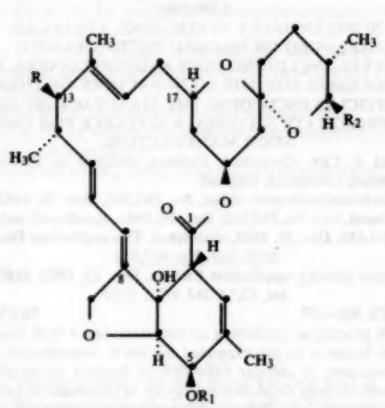
Continuation of Ser. No. 803,354, Dec. 2, 1985, abandoned. This application Jul. 14, 1986, Ser. No. 885,066

Claims priority, application Switzerland, Dec. 4, 1984, 05750/84

Int. Cl.[4] C07D *315/00, 311/96;* A61K *31/365*

U.S. Cl. 514—450 **15 Claims**

1. A compound of formula I



wherein

R_1 is hydrogen or an acyl or silyl protecting group;

R_2 is methyl, ethyl, isopropyl or sec-butyl; and

R is a radical R_3 which is bound through sulfur and is selected from the group consisting of C_1–C_{10}-alkyl, C_1–C_{10}haloalkyl, C_1–C_{10}hydroxyalkyl, C_1–C_{10}mercaptoalkyl, C_2–C_{10}-alkoxyalkyl, C_3–C_{10}alkoxyalkoxyalkyl, hydroxy- or mercapto-substituted C_3–C_{10}alkoxyalkoxyalkyl, C_4–C_{10}alkoxyalkoxyalkoxyalkyl, hydroxy- or mercapto-substituted C_4–C_{15}alkoxyalkoxyalkoxyalkyl, C_2–C_{10}-alkenyl, C_2–C_{10}haloalkenyl, C_2–C_{10}alkynyl, C_2–C_{10}haloalkynyl, phenyl which is unsubstituted or substituted by halogen, C_1–C_3-alkyl, C_1–C_3haloalkyl, C_1–C_3alkoxy, C_1–C_3-haloalkoxy, cyano and/or nitro, and benzyl which is unsubstituted or substituted by halogen, C_1–C_3alkyl, C_1–C_3-haloalkyl, C_1–C_3alkoxy, C_1–C_3haloalkoxy, cyano and/or nitro, or R is one of the groups —SH or —S—C(O)OR_4, wherein R_4 is C_1–C_{10}alkyl, C_1–C_{10}haloalkyl, or a phenyl or benzyl group which is unsubstituted or substituted by halogen, C_1–C_3alkyl, C_1–C_3haloalkyl, C_1–C_3alkoxy, C_1–C_3haloalkoxy, cyano and/or nitro.

4,696,946

TOPICAL TREATMENT OF HYPERPROLIFERATIVE SKIN DISEASES

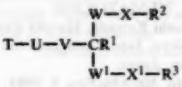
Michael J. Green, Skillman, and Anil K. Saksena, Upper Montclair, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Aug. 30, 1985, Ser. No. 772,077

Int. Cl.[4] A61K *31/19, 31/41*

U.S. Cl. 514—574 **13 Claims**

1. A process for treating a human being for hyperproliferative skin disease comprising the topical adminstration of an effective amount of a compound having the structural formula I, II or III:



I

T is straight or branched chain alkyl having from 7 to 15 carbon atoms which may optionally contain from 1 to 3 non-cumulative double or triple bonds;

U is $—CH_2CH_2—$, —CH=CH— or —C≡C—;

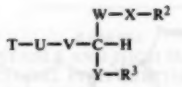
V is a straight or branched chanin alkylene having from 1 to 4 carbon atoms or is a direct bond;

W and W^1 may be the same or different and are O or $S(O)_m$ wherein m is 0, 1 or 2;

X and X^1 may be the same or different and are straight or branched chain alkylene having from 2 to 12 carbon atoms which may optionally contain from 1 to 3 non-cumulative double or triple bonds and which may optionally be substituted with $—NHR^a$ {wherein R^a is hydrogen, alkyl having from 1 to 6 carbon atoms, $COCF_3$, $CO(CH_2)_2CH(NH_2)CO_2H$, or SO_2R^b (wherein R^b is alkyl having from 1 to 6 carbon atoms or CF_3)};

R^1 is hydrogen or straight or branched chain alkyl having from 1 to 6 carbon atoms;

R^2 and R^3 may be the same or different and are CH_2OR^c {wherein R^c is hydrogen, carboxylic acyl having from 1 to 6 carbon atoms, tetrahydropyran-2-yl or $COCH_2CH_2CO_2H$}, CHO, 2-tetrazolyl, COR^d {wherein R^d is hydroxy, alkoxy having from 1 to 6 carbon atoms, $OCH_2OC(O)C(CH_3)_3$, NHR^e (wherein R^e is hydrogen, alkyl having from 1 to 6 carbon atoms or CH_2CO_2H)} or SO_3H, with the proviso that at least one of R^2 and R^3 is 2-tetrazoly or carboxyl;

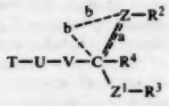


II

wherein

T, U, V, W, X, R^2 and R^3 are defined above;

Y is straight or branched chain alkylene having from 1 to 12 carbon atoms which may optionally be substituted with the group OR^c {wherein R^c is as defined above} and may optionally contain from 1 to 3 non-cumulative double or triple bonds; or



III

wherein

T, U, V, R^2 and R^3 are defined above;

Z and Z^1 may be the same or different and are straight or branched chain alkylene having from 1 to 12 carbon atoms which may optionally contain from 1 to 3 non-cumulative double or triple bonds;

R^4 is hydrogen, hydroxyl, or is combined with Z to form a double bond as indicated by the dashed line "a" or a cyclopropyl ring as indicated by the dashed lines "b", or 1-methane,1,1-{(2-pentadecynylidene) bis(oxy)} bis carboxylic acid.

4,696,947

NEMATOCIDE

Yasuhisa Kurosu; Hiroshi Kawada; Haruki Kanasugi, and Akio Hosokawa, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 300,618, Sep. 9, 1981, abandoned. This application Feb. 1, 1983, Ser. No. 462,964

Claims priority, application Japan, Oct. 21, 1980, 55-146360; Oct. 21, 1980, 55-146361

Int. Cl.[4] A01N *25/00, 47/10*

U.S. Cl. 514—478 **7 Claims**

1. A formulation for a parasitic-nematocidal composition comprising 5-40% of S-methyl-N,N-di C_{1-2} alkyl-thiocarbamate as an active ingredient of said composition; and an inert carrier; wherein the improvement comprises:

formulating said nematocidal composition in the form of granules.

4,696,948

INDANYL DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Karl Petzoldt, Berlin, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

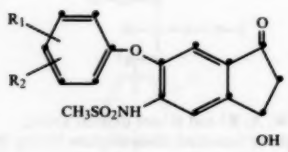
Filed Nov. 28, 1984, Ser. No. 675,596

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1983, 3343331

Int. Cl.[4] A01N *41/06;* **A61K** *31/18;* **C07C** *143/74*

U.S. Cl. 514—605 **6 Claims**

1. A compound of the formula



wherein R_1 and R_2, independently chosen, are hydrogen, fluorine or chlorine, with the proviso that R_1 and R_2 are not both H.

4,696,949

NOVEL TRI-PHENYL ALKANE AND ALKENE DERIVATIVES AND THEIR PREPARATION AND USE

Reijo J. Toivola; Arto J. Karjalainen, both of Oulu; Kauko O. A. Kurkela, Oulu; Marja-Liisa Soderwall, Oulu; Lauri V. M. Kangas, Turki; Guillermo L. Blanco, Oulu, and Hannu K. Sunduiqst, Kaarina, all of Finland, assignors to Farmos Group Ltd., Turku, Finland

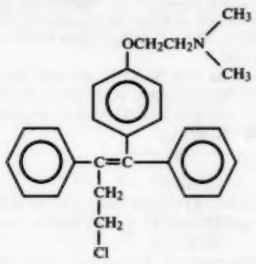
Continuation of Ser. No. 497,813, May 25, 1983, abandoned. This application Jan. 29, 1986, Ser. No. 823,856

Claims priority, application United Kingdom, Jun. 25, 1982, 8218414

Int. Cl.[4] A61K *31/135;* **C07C** *91/06*

U.S. Cl. 514—648 **7 Claims**

1. A compound of the formula:



or a non-toxic pharmaceutically acceptable salt or N-oxides thereof.

4,696,950

SUBSTANTIALLY STATIC-FREE, CELLULAR EXPANDED OR FOAMED THERMOPLASTIC ARTICLES, INCLUDING CUPS AND CONTAINERS, AND PROCESSES FOR THE MANUFACTURE OF THESE ARTICLES INCLUDING THE MANUFACTURE OF INTERMEDIATE MATERIALS SUITABLE FOR USE IN SUCH MANUFACTURE

Harold S. Cox, Greenford, England, assignor to Roboserve Limited, Greenford, England

Continuation-in-part of Ser. No. 563,580, Dec. 20, 1983, abandoned, Ser. No. 563,620, Dec. 20, 1983, abandoned, and Ser. No. 563,610, Dec. 20, 1983, abandoned. This application Dec. 11, 1985, Ser. No. 807,812

Claims priority, application Canada, Dec. 23, 1982, 418528

Int. Cl.[4] C08J *9/22, 9/24*

U.S. Cl. 521—57 **54 Claims**

1. A process of combining an anti-static agent with thermoplastic beads to be pre-expanded for use to manufacture cups or containers of cellular expanded or foamed thermoplastic material, or fully expanded into a cup or container of cellular expanded or foamed thermoplastic material, the anti-static agent being suitable for use with comestibles and being combined in sufficient amounts either:

(a) with thermoplastic beads to be expanded prior to injection into a hot air moisture free pre-expander, and thereafter injecting the combinations into the preheated hot air moisture free pre-expander for pre-expanding the beads; or

(b) with the beads in a preheated hot air moisture free pre-expander shortly after injection of the beads into the preheated hot air moisture free pre-expander for pre-expanding the beads; or

(c) in liquid form the hot moisture free air for delivery to a

mold cavity for intermixing with pre-exapnded beads for molding into the cup or container, whereby the anti-static agent upon contacting the said heated environment is misted or atomized, filling the space of the environment, uniformly coating the expanding beads with anti-static agent in the pre-expander or mold rendering the material anti-static.

4,696,951

ETHYLENE VINYL ACETATE COMPOSITIONS FOR FLOCKING ADHESIVES

David Lunsford, Mauldin, S.C., and James L. Walker, Whitehouse Station, N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed May 12, 1986, Ser. No. 861,964
Int. Cl.[4] L08J *9/30*
U.S. Cl. 521—65 10 Claims

1. A foamable flocking adhesive composition characterized by an excellent balance of softness, strength, and formulation stability comprising a thickener selected from the group consisting of hydroxyethylcellulose, carboxymethylcellulose, polyacrylatehydrolyzed acrylonitrile and carboxylic acid/acrylate emulsions or solutions, pigments, a foaming agent activatable by beating air or another gas into the composition comprising a water soluble salt of an aliphatic carboxylic acid containing 16 to 20 carbon atoms, and an aqueous emulsion, the latter prepared by the emulsion polymerization of a copolymer consisting essentially of:

(a) a vinyl ester of an alkanoic acid having 1 to 13 atoms interpolymerized with the following comonomers;
(b) 5 to 30% by weight of ethylene;
(c) 0.5 to 6% by weight of N-methylol acrylamide or N-methylol methacrylamide;
(d) 1 to 5% by weight of an alkenoic acid having 3 to 6 carbon atoms or an alkenedioic acid having 4 to 6 carbon atoms;
(e) 0.2 to 3% by weight of a latex stabilizer; and
(f) 0 to 1% by weight of at least one polyunsaturated copolymerizable monomer;

the vinyl ester being added in an amount to total 100%.

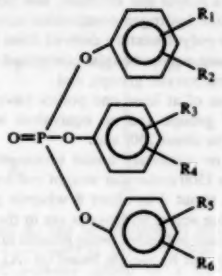
4,696,952

PRODUCTION OF POLYURETHANE FOAM

Kenji Shimomura; Shigeaki Kouketsu, both of Yokohama; Toru Okuyama, Sagamihara, and Take Sato, Yokohama, all of Japan, assignors to Ikeda Bussan Co., Ltd., Kanagawa and Bridgestone Corp., Tokyo, both of, Japan

Filed Jul. 19, 1985, Ser. No. 756,800
Claims priority, application Japan, Jul. 26, 1984, 59-156176
Int. Cl.[4] C08K *5/52, 5/53;* C08G *18/08*
U.S. Cl. 521—107 15 Claims

1. A process for producing a flexible polyurethane foam which comprises reacting a polyhydroxy compound, organic polyisocyanate compound, blowing agent, catalyst, foam stabilizer, and flame retardant, wherein the flame retardant contains a triaryl phosphate ester presented by the following formula:



wherein R_1 to R_6 are substituent groups independently selected from the group consisting of H and C_nH_{2n+1} and n is an integer of 1 to 9, with the exception of the instances wherein $R_1=R_3=R_5=H$ and $R_2=R_4=R_6=CH_3$,

and wherein said polyhydroxy compound is a mixture composed of (1) 100 parts by weight of a high-molecular-weight polyhydroxy compound having a hydroxyl number lower than 100 and (2) 0.5 to 10 parts by weight of a low-molecular-weight polyhydroxy compound having a hydroxyl number higher than 560 and having 2 to 4 hydroxyl groups in each molecule.

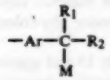
4,696,953

SCAVENGERS FOR THE REMOVAL OF IMPURITIES FROM ARSINE AND PHOSPHINE

Glenn M. Tom, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 888,180, Jul. 21, 1986, Pat. No. 4,659,552.
This application Dec. 5, 1986, Ser. No. 938,701
Int. Cl.[4] C08F *14/00*
U.S. Cl. 521—146 3 Claims

1. A macroreticulate polymer scavenger comprising the reaction product of (1) a hydride selected from the group consisting of arsine and phosphine and (2) a metallated macroreticulate polymer having a plurality of pendant functional groups or mixtures of functional groups having the general formula:



where Ar is an aromatic hydrocarbon radical containing from one to three rings, R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen and alkyl hydrocarbon radicals containing from 1 to 12 carbon atoms, and M is a metal selected from the group consisting of sodium, potassium and lithium, said metallated macroreticulate polymer having within its pores a compound selected from the group consisting of a 1–12 carbon alkyl compound of M and a hydride of M, or mixtures thereof.

4,696,954

THERMALLY STABLE AND HIGH IMPACT RESISTANT STRUCTURAL POLYURETHANE FOAM

James R. Pritchard, and Dale F. Regelman, both of Wallingford, Conn., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 23, 1986, Ser. No. 854,968
Int. Cl.[4] C08G *18/00, 18/14*
U.S. Cl. 521—167 20 Claims

1. A molded cellular polymer which comprises the reaction product obtained by bringing together in the presence of a

blowing agent and a urethane forming catalyst, an organic polyisocyanate, a polyol and extender, said polyol and extender being an active hydrogen composition comprising:

A. a polyester polyol mixture derived from the reaction of,
   (i) an aromatic polycarboxylic compound containing two or more carboxylic groups; and
   (ii) an excess of at least one polyol having from 2 to 8 hydroxyl groups and an equivalent weight of from about 30 to about 250; and

B. a primary or secondary amine terminated polyether of greater than 1500 molecular weight and amine functionality of from about 2 to about 8 wherein greater than 50 percent of the active hydrogens are in the form of amine hydrogens, said polyether being present in from about 5 to about 30 percent by weight based on (A) and (B).

4,696,955

X-RAY OPAQUE DENTAL FILLING COMPOSITION-BROMINATED AROMATIC DI-METHACRYLIC ESTER POLYMERIZABLE COMPONENT

Werner Kuhlmann, Mainz-Hechtsheim, Fed. Rep. of Germany, assignor to Blendax-Werke R. Schneider GmbH & Co., Mainz, Fed. Rep. of Germany

Filed Nov. 9, 1984, Ser. No. 669,846

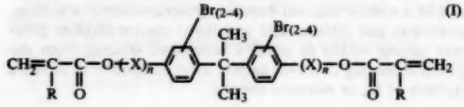
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1983, 3342601

Int. Cl.[4] A61K *6/08;* **A61C** *8/00*

U.S. Cl. 522—77 **24 Claims**

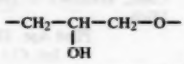
1. A dental restoration material capable of being polymerized in a tooth cavity under physiologically tolerable conditions, comprising:

between approximately 15 and approximately 50 percent by weight of polymerizable compounds, said polymerizable compounds containing an effective amount to impart X-ray opacity to the composition of one or more brominated monomers of the formula:



where R represents hydrogen or a methyl group, X represents a

$-CH_2-CH_2-O-$, $-CH_2CH_2CH_2-O-$ or



group and n is 0 to 3; and

a silanized dental filler.

4,696,956

RESIN COMPOSITION HAVING ELECTROMAGNETIC WAVE SHIELDING EFFECT

Takeshi Nabeta, and Isamu Hanahara, both of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 645,938, Aug. 30, 1984, Pat. No. 4,602,051. This application Nov. 20, 1985, Ser. No. 800,004

Claims priority, application Japan, Sep. 7, 1983, 58-164353; Sep. 14, 1983, 58-169909; Dec. 2, 1983, 58-227019; Dec. 28, 1983, 58-247068; Mar. 10, 1984, 59-46277

The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.

Int. Cl.[4] C08K *3/04, 3/10;* **H01B** *1/00;* **G21F** *1/10*

U.S. Cl. 523—137 **19 Claims**

1. A resin composition having an electromagnetic wave shielding effect, comprising:

35 to 90 wt% of copolymer of an ethylenic unsaturated nitrile, a diene rubber and an aromatic vinyl compound or a mixture of said copolymer with another copolymer of an ethylenic unsaturated nitrile and an aromatic vinyl compound;

1 to 25 wt% of a plasticizer;

an electrically conductive filler consisting essentially of 5 to 25 wt% of carbon fibers with metallized surfaces; and

0.5 to 10 wt% of an alkylamine antistatic agent.

4,696,957

MULTI-COMPONENT COATING COMPOSITIONS

Hilary E. Adeney, Surrey Hills, and Derrard M. Hall, Glen Waverley, both of Australia, assignors to Dulux Australia Ltd., Victoria, Australia

Filed Jul. 9, 1985, Ser. No. 753,067

Claims priority, application Australia, Aug. 27, 1984, PG6784

Int. Cl.[4] C08G *59/18, 59/42*

U.S. Cl. 523—406 **6 Claims**

1. An aqueous coating composition comprising at least two discrete film-forming components which are mixed prior to application of the composition to a substrate and which react to form a continuous, cross-linked coating film, the components together including

(a) a constituent which comprises epoxide groups;

(b) a constituent which comprises addition polymer; and

(c) a constituent which comprises reactive groups which are capable of reaction with epoxide groups, characterised in that

(d) the constituent (a) comprises on average at least one epoxide group per molecule and has a number average molecular weight of from 200–10,000;

(e) the addition polymer of constituent (b) comprises from 5–80% by weight of the film-forming solids and is in the form of an aqueous dispersion and further characterised in that the particles of the dispersion of addition polymer additionally comprise at least one of the other constituents and;

(f) there is present in the composition from 0.2–1.5 equivalents of reactive groups per equivalent of epoxide groups.

4,696,958

ELECTROPHORETIC TECHNIQUE FOR SEPARATION OF LIPOPROTEINS AND ELECTROPHORETIC GEL FOR USE THEREIN

William A. Gurske, Placentia, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 22, 1985, Ser. No. 801,113

Int. Cl.[4] C08L *1/00, 3/00, 5/00*

U.S. Cl. 524—21 **20 Claims**

1. An electrophoretic gel comprising a matrix selected from the group consisting of polysaccharides and derivatives thereof, a buffer having a buffering capacity in an alkaline pH range, and an effective amount of a poly(oxyethylene)-poly(oxypropylene)-poly(oxyethylene) block copolymer.

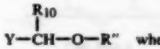
4,696,959
MODIFIED PIPERIDINES AS ULTRAVIOLET LIGHT STABILIZERS

Wen-Hsuan Chang; Michael M. Chan, and Robert Piccirilli, all of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 26, 1983, Ser. No. 536,143
Int. Cl.[4] C08K *5/34*; C09K *15/16*; C08F *82/80*; C07D *251/00*
U.S. Cl. 524—91 **16 Claims**

1. A reaction product which comprises a material formed from the reaction of

(a) a methylol or alkoxy alkyl-containing material which is represented by the following structural formula:

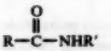


wherein:

R″ is hydrogen or C_1 to C_6 alkyl,

R_{10} is hydrogen or methyl

Y is a radical derived from a material selected from the group consisting of amino substituted triazines, ureas, glycolurils, phenols, and amides of the formula:



wherein:

R′ is hydrogen or C_1 to C_{12} alkyl and R is an aliphatic, cycloaliphatic, or olefinic radical, or an acrylic polymer moiety; and

(b) an alkyl substituted piperidine-containing material having at least one group selected from hydroxyl, carboxyl, amido, and ureido, said reaction proceeding between a methylol or alkoxy alkyl group of (a) and the group selected from hydroxyl, carboxyl, amido and ureido of (b).

4,696,960
COMPOSITION OF TRIGLYCIDYLISOCYANURATE WITH REDUCED TACKINESS

Egidius J. M. Verheijen, Born, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

Filed Sep. 18, 1985, Ser. No. 777,301
Claims priority, application Netherlands, Sep. 19, 1984, 8402868
Int. Cl.[4] C08K *5/34*
U.S. Cl. 524—100 **8 Claims**

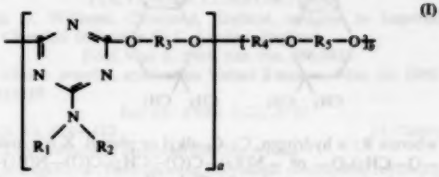
1. Composition of triglycidylisocyanurate with reduced tackiness, wherein the preparation consists of a solid mixture of at least triglycidylisocyanurate and a non-reactive polyester, wherein said polyester is non-functional.

4,696,961
POLYMERIC COMPOUNDS CONTAINING PIPERIDINE RADICALS AND THEIR USE AS STABILIZERS FOR SYNTHETIC POLYMERS

Giuseppe Cantatore, Bitonto, Italy, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

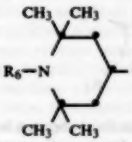
Filed Sep. 20, 1984, Ser. No. 652,631
Claims priority, application Italy, Sep. 23, 1983, 22976 A/83
Int. Cl.[4] C08K *5/34*; C08F *283/00*
U.S. Cl. 524—100 **3 Claims**

1. A light-stabilized, heat-stabilized and oxidation-stabilized polymer composition comprising a synthetic polymer and one or more stabilizers of the formula (I),



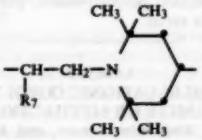
(I)

in which R_1 and R_2 can be identical or different and are (1) hydrogen, (2) C_1–C_{18}-alkyl, (3) C_2–C_{12}-alkyl substituted by —OH, a C_1–C_{18}-alkoxy group or a C_2–C_{18}-dialkylamino group, (4) C_3–C_{18}-alkenyl, (5) C_5–C_{18}-cycloalkyl, (6) C_6–C_{18}-aryl, (7) C_7–C_{18}-aralkyl or (8) a radical of the formula

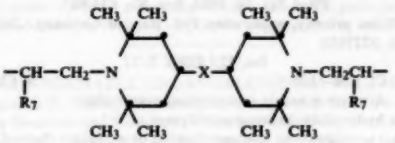


(II)

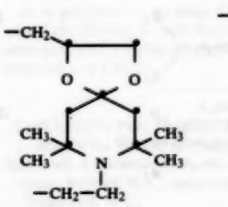
where R_6 is hydrogen, C_1–C_{12}-alkyl, C_3–C_{12}-alkenyl or -alkynyl, C_7–C_{12}-aralkyl or C_1–C_{12}-acyl, or R_1 and R_2, together with the nitrogen atom to which they are bonded, are a heterocyclic radical, such as pyrrolidin-1-yl, piperidin-1-yl, hexahydroazepin-1-yl, morpholin-4-yl or 4-methylpiperazin-1-yl, R_3 and R_5 can be identical or different and are radicals of the formula (III), (IV), (V) or (VI)



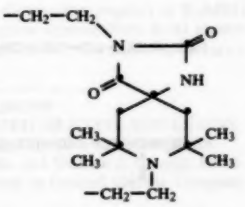
(III)



(IV)

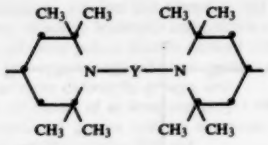


(V)



(VI)

and R_5 additionally can be a radical of formula VII



(VII)

wherein R_7 is hydrogen, C_1–C_6-alkyl or phenyl, X is a group —O—$(CH_2)_n$O— or —N(R_8)—C(O)—$(CH_2)_n$C(O)—N(R_8)—, n is a number between 1 and 6, R_8 has the same meaning as R_1 or R_2 and Y is C_2–C_{12}-alkylene, C_3–C_{12}-alkylene substituted by one hydroxyl or containing an oxygen atom in the chain, C_4–C_{12}-alkenylene or C_8–C_{12}-aralkylene, R_4 is C_2–C_{18}-diacyl or a radical of the formula (VIII)

(VIII)

in which R_1 and R_2 are as defined above, a is a number between 0.2 and 1, and b is a number between zero and 0.8; and the compounds of the formula (I) have a number average molecular weight $\bar{M}n$ between 1,000 and 20,000, said compound(s) of formula (I) being present in a quantity from 0.01 to 5% by weight, relative to the weight of the synthetic polymer which is selected from the group consisting of high-density and low-density polyethylene, polypropylene, ethylene/propylene copolymers, ethylene vinyl acetate copolymers, polybutadiene, polyisoprene, polystyrene, butadiene/styrene copolymers, vinyl chloride/vinylidene chloride polymers and copolymers, polyoxymethylene, polyurethanes, saturated and unstaturated polyesters, polyamides, polycarbonates, polyacrylates, alkyd resins and epoxide resins.

4,696,962

HYDROPHILIC CATIONIC COPOLYMERS OF ACRYLAMIDE OR METHACRYLAMIDE

Bernard Danner, Riedisheim, France, and James R. Ruynon, Oberwil, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Jul. 24, 1984, Ser. No. 633,807

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1983, 3327600

Int. Cl.[4] C08K *5/52*

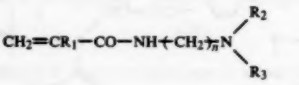
U.S. Cl. 524—140 **34 Claims**

1. A water-miscible composition comprising

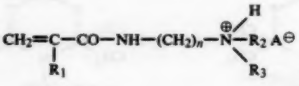
(a) a hydrophilic cationic copolymer of

(a_1) acrylamide or methacrylamide or a mixture thereof, and

(a_2) a cationic monomer of formula I or II



I



II

in which

R_1 is hydrogen or methyl,

each of R_2 and R_3, independently, is methyl or ethyl,

n is 2 or 3

and $A^{\ominus}$ is an anion,

or mixture thereof, the molar quantity of cationic monomer units (a_2) being from 0.2 to 9 mol % of the total (a_o)+(a_2) and said copolymer being free of anionic monomer components,

(b) an anionic sulphonated hydrocarbon surfactant in the form of a salt which does not give a true solution in water, the molar quantity of (b) being not greater than the molar quantity of the cationic monomer units of (a_2), and the cationic monomer units (a_2) being at least partially converted to a salt form having as anion the anion of the anionic surfactant (b), and

(c) a water-immiscible oil in which the copolymer (a) is insoluble.

4,696,963

HALOGENATED ALKYL PHOSPHATE ESTERS AND POLYMER SYSTEMS INCORPORATING THEM

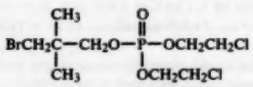
James A. Albright, San Leandro, Calif., and Theodore C. Wilkinson, Dublin, Ohio, assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Filed Oct. 10, 1985, Ser. No. 786,208

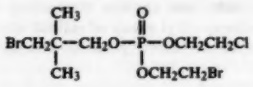
Int. Cl.[4] C08K *5/53*

U.S. Cl. 524—144 **8 Claims**

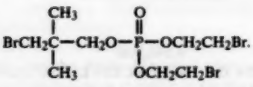
1. A flame retardant non-mutagenic halogenated alkyl phosphate ester mixture consisting essentially of compounds of the formula:



(I)



(II)



(III)

4,696,964

COMPOSITIONS STABILIZED WITH ETHERS OF DI- AND TRI-SUBSTITUTED HYDROXYLAMINES

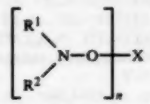
Ramanathan Ravichandran, Yonkers, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 11, 1986, Ser. No. 850,810

Int. Cl.[4] C07C *93/12, 93/08, 93/02;* **C08K** *5/32*

U.S. Cl. 524—236 **32 Claims**

1. A composition of matter comprising a, polymer or lubricating oil subject to oxidative, thermal and actinic degradation stabilized with an effective stabilizing amount of a compound selecting from the group consisting of α,α′-bis (benzyloxyamino)-p-xylene and compounds having the formula



wherein

R^1 is hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms;

R^2 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12

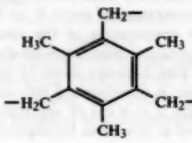
carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms;

n is 1–4;

X, when n is 1, is the same as R^2;

X, when n is 2, is alkylene of 2 to 12 carbon atoms, cycloalkylene of 6 to 10 carbon atoms or alkylenearylenealkylene of 8 to 10 carbon atoms;

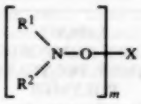
X, when n is 3, is alkanetriyl of 3 to 6 carbon atoms or



and

X, when n is 4, is alkanetetrayl of 4 to 6 carbon atoms.

25. A compound of the formula



wherein

m is 2–4;

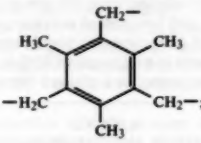
R^1 is hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms;

R^2 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms;

at least one of R^1 and R^2 being said aralkyl or said substituted aralkyl when m is 2;

X, when m is 2, is alkylene of 2 to carbon atoms, cycloalkylene of 6 to 10 carbon atoms or alkylenearylenealkylene of 8 to 10 carbon atoms;

X, when m is 3, is alkanetriyl of 3 to 6 carbon atoms or



and X, when m is 4, is alkanetetrayl of 4 to 6 carbon atoms.

4,696,965

POLYAMIDE-ACRYLIC BLENDS

Jerald K. Rasmussen, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 23, 1985, Ser. No. 758,044

Int. Cl.⁴ C08L *77/00;* **C08K** *5/05*

U.S. Cl. 524—380 **12 Claims**

1. A composition of matter comprising a blend comprising:

(1) at least one condensation-based polyamide prepared by reaction of stoichiometric amounts of acid and amine functionality, and

(2) at least one pressure sensitive acrylic polymer,

the ratio by weight of the acrylic and polyamide polymers being 99.99:0.01 to 0.01:99.99, said blend being only organic solvent soluble and said blend being an uncrosslinked pressure sensitive adhesive.

4,696,966

FLAME RETARDANT, IMPACT RESISTANT POLYAMIDE COMPOSITIONS

Ian G. Williams, Cleveland, England, assignor to Imperial Chemical Industries PLC, London, England

Filed May 1, 1986, Ser. No. 858,043

Claims priority, application United Kingdom, May 14, 1985, 8512119

Int. Cl.⁴ C08K *3/22, 3/10*

U.S. Cl. 524—412 **12 Claims**

1. A polyamide composition comprising:

a. a synthetic, fibre forming polyamide comprising repeating carbonamide groups,

b. from 1 to 25% by weight of the total composition of a rubbery toughening additive copolymer having a glass transition temperature below 20° C., and which is formed from at least one ethylenically unsaturated monomer and a monomer providing functional groups selected from maleic, fumaric, norbornadiene and succinic anhydrides or an alicyclic carboxylic acid or functional derivative thereof having a cis-form double bond in the ring,

c. from 10 to 30% by weight of the total composition of a fire retardant additivie comprising a halogenated polymer having a weight average molecular weight in excess of 5,000, wherein the halogenated polymer is selected from the group consisting of poly(tribromostyrene), brominated epoxy resins, brominated polyphenylene oxide and poly(penta halobenzyl acrylate), and

d. a synergist for the fire retardant additive, the percentage weights of the components of the composition totaling 100% by weight.

4,696,967

THERMOPLASTIC ELASTOMER COMPOSITIONS

Charles D. Shedd, Blairstown, and David J. Anzini, Hampton Township, Hunterdon County, both of N.J., assignors to BP Performance Polymers Inc., Hackettstown, N.J.

Continuation-in-part of Ser. No. 736,547, May 21, 1985, abandoned. This application Nov. 6, 1986, Ser. No. 926,888

Int. Cl.⁴ C08L *23/10, 33/04, 23/26;* **C08K** *3/22*

U.S. Cl. 524—437 **19 Claims**

1. A compatibilized low smoke and flame retardant reprocessable thermoplastic elastomer composition consisting essentially of a partially cured binary polymer blend of an acrylate rubber and a polyolefin resin selected from the group consisting of crystalline propylene homopolymers and copolymers, and a compatibilizing amount of aluminum trihydrate, wherein the ratio of acrylate rubber to polyolefin resin varies from about 95:5 to 50:50 respectively, in parts by weight, and the aluminum trihydrate is present in amounts of about 25 to 250 parts per 100 parts of acrylate rubber and polyolefin resin.

4,696,968

MELT-FORMABLE ORGANOALUMINUM POLYMER

Frederick N. Tebbe, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 4, 1986, Ser. No. 903,448

Int. Cl.⁴ C08G *79/10*

U.S. Cl. 524—610 **27 Claims**

1. A polymer comprising the reaction product of R_2AlNH and R_3Al having a mole fraction derived from R_3Al greater than zero and less than 1, wherein R is selected from C_xH_{2x+1}, wherein x is 1 to 10.

4,696,969

EMULSION POLYMERIZED SILICONE EMULSIONS HAVING SILOXANE-BONDED UV ABSORBERS

Raymond J. Thimineur, Scotia, and William J. Raleigh, Rensselaer, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Jul. 27, 1984, Ser. No. 634,935

Int. Cl.⁴ C08K *5/06*

U.S. Cl. 524—762 **11 Claims**

1. A method for making an emulsion substantially free of

amino-functional units and having a substantially neutral or acidic pH, comprising:

I. preparing an aqueous emulsion consisting essentially of:

(a) a low molecular weight polydiorganosiloxane,

(b) an emulsifier or mixture of emulsifiers,

II. partially polymerizing said low molecular weight polydiorganosiloxane by emulsion polymerization;

III. adding to the partially emulsion polymerized polydiorganosiloxane an ultraviolet light absorbing agent, and

IV. emulsion polymerizing the polydiorganosiloxane of the emulsion of step III such that the ultraviolet light absorbing agent is chemically bonded to the polydiorganosiloxane prepared by said emulsion polymerization.

4,696,970

METHOD FOR PRODUCING A SILICONE POLYMER-FILLER MIXTURE

Shin-ichi Sumimura, and Akira Tazawa, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed May 12, 1986, Ser. No. 861,882

Claims priority, application Japan, May 28, 1985, 60-114454

Int. Cl.[4] C08L *83/04*

U.S. Cl. 524—860 **12 Claims**

1. Method for producing a silicone polymer-filler mixture, characterized in that a silicone polymer-filler mixture is produced by passing

(A) 100 weight parts siloxane oligomer selected from the group consisting of

(a) polydiorganosiloxane with the general formula

$$HO(R_2SiO)_xH,$$

(b) polydiorganosiloxane with the general formula

$$(R_2SiO)_y$$

and their mixtures,

where each R is independently an unsubstituted or substituted monovalent hydrocarbon group, x is from 1 to 200 on average and y is from 3 to 10 on average,

(B) 1 to 150 weight parts filler; and

(C) a catalyst in a quantity sufficient to catalyze the polymerization of said silicone oligomer in the presence of said filler,

through a continuous kneader extruder with polymerization of said silicone oligomer into silicone polymer.

4,696,971

PROCESS FOR THE PREPARATION OF POLYVINYL BUTYRAL HAVING IMPROVED PROPERTIES

Robert Degeilh, Le Port Marly, France, assignor to Saint Gobain Vitrage, Courbevoie, France

Continuation of Ser. No. 620,053, Jun. 13, 1984, abandoned. This application Mar. 10, 1986, Ser. No. 838,230

Claims priority, application France, Jun. 14, 1983, 83 09840

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—61 **14 Claims**

1. A process for the preparation of a polyvinyl butyral having improved properties which comprises subjecting a polyvinyl alcohol in an aqueous medium in the presence of butyraldehyde and an acid catalyst and an emulsifier to form a reaction mixture and thereafter recovering the polyvinyl butyral, said process being characterized in that:

said polyvinyl alcohol comprises about 8 to 15 percent by weight of said aqueous medium;

said emulsifier comprises sodium dioctyl sulfosuccinate (DOS) in an amount effective as an emulsifier, and between about 0.1 and 0.3 percent by weight calculated on the weight of polyvinyl alcohol;

said DOS is added to said reaction mixture before said butyraldehyde;

prior to addition of said butyraldehyde to said reaction mixture, said aqueous medium of polyvinyl alcohol, acid catalyst, and emulsifier have a temperature of about 5° to 12° C.;

said butyraldehyde comprises sufficient weight to react about 75 to 88 percent of said polyvinyl alcohol in said reaction mixture;

said butyraldehyde is reacted gradually to precipitate said polyvinyl butyral within a time period ranging from about 10 to 90 minutes after the start of said reaction;

subsequent to forming said reaction mixture, said reaction mixture is agitated for a time period of at least about 30 minutes at a temperature of about 8° to 15° C.;

subsequently, the temperature of the reaction mixture is raised to a temperature range between about 60° to 80° C. for a period of time between about 1½ and 4 hours;

subsequently a base is incorporated into said reaction mixture to neutralize it to a pH of approximately 5, the pH being maintained at this value throughout the subsequent recovery process;

said reaction mixture then cured between said 60° to 80° C. temperature range for a period of less than about 10 minutes; and

precipitated polyvinyl butyral is then washed from said reaction mixture with water.

4,696,972

POLYMERIC MOLDING COMPOSITION CONTAINING STYRENIC COPOLYMER, POLYCARBONATE AND MBS POLYMER

Larry G. Bourland, Downingtown, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 578,941, Feb. 10, 1984, Pat. No. 4,530,965. This application Apr. 1, 1985, Ser. No. 718,588

Int. Cl.[4] C08L *69/00*

U.S. Cl. 525—67 **9 Claims**

1. A polymeric molding composition which comprises a blend of (A) a polycarbonate resin, (B) a polmerization product of (B.1) a vinyl aromatic monomer and (B.2) an $\alpha\beta$ unsaturated cyclic anhydride in the presence of a rubber, and (C) a core-shell copolymer in which said core is about 90 to 50 parts by weight of polybutadiene or a copolymer of butadiene with up to 50 percent of at least one monomer selected from the group consisting of styrene, lower alkyl methacrylates, lower alkyl acrylates, acrylonitrile and olefins, and in which said shell is about 10 to 50 parts of a lower alkyl methacrylate or a copolymer of a lower alkyl methacrylate with up to 50 percent of at least one monomer selected from the group consisting of styrene, acrylonitrile and lower alkyl acrylates; wherein the rubber is a conjugated diene/styrenic copolymer and said conjugated diene is present in an amount of 65% by weight or more and is butadiene, isoprene, or a mixture thereof.

4,696,973

IMPACT MODIFIER AND THERMOPLASTIC RESIN COMPOSITION USING THE SAME

Kazumasa Kamata, Koganei; Kazuo Ueda, and Kiyokazu Kitai, both of Ohtake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Aug. 20, 1984, Ser. No. 641,989

Claims priority, application Japan, Aug. 25, 1983, 58-155325; Aug. 25, 1983, 58-155326

The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.

Int. Cl.[4] C08L *51/04, 53/04*

U.S. Cl. 525—71 **4 Claims**

1. An impact modifier comprising a blend of 100 parts by weight of a graft copolymer (A) obtained by graft-polymerizing a monomer or a monomer mixture consisting of 95 to 100% by weight of at least one monomer selected from the group consisting of alkyl acrylates, alkyl methacrylates, aromatic vinyl compounds and vinyl cyanide compounds and 0 to 5% by weight of a polyfunctional crosslinking agent on an acrylic elastomer mainly composed of an alkyl acrylate and containing 0.1 to 5% by weight of polyfunctional crosslinking agent, a

butadiene elastomer composed of a polybutadiene or a copolymer of 50% by weight or more of a butadiene and 50% by weight or less of other vinyl compound copolymerizable therewith and containing 0 to 5% by weight of a polyfunctional crosslinking agent, or mixtures thereof, and 0.1 to 20 parts by weight of a copolymer (B) obtained by copolymerizing 3 to 30% by weight of an unsaturated acid monomer and 97 to 70% by weight of vinyl monomer copolymerizable therewith selected from the group consisting of alkyl acrylates, alkyl methacrylate, aromatic vinyl compounds, vinyl cyanide compounds and mixtures thereof.

4,696,974

HYDROPHILIC SILICONE COMPOSITE AND THE METHOD FOR PRODUCING THEREOF

Jirí Sulc; Petr Vondrácek, and Petr Lopour, all of Praha, Czechoslovakia, assignors to Ceskoslevenska Akademie Ved, Czechoslovakia

Filed May 13, 1986, Ser. No. 862,675

Claims priority, application Czechoslovakia, May 20, 1985, 3599-85

Int. Cl.[4] C08L *83/04*

U.S. Cl. 525—92 **3 Claims**

1. A hydrophilic silicone composite comprising a cross-linked silicone polymer which forms a continuous matrix, having incorporated therein a powdered hydrogel filler comprising particles having a particle size from about 10^{-6} to 10^{-1} mm, said hydrogel being selected from the group consisting of

cross-linked polymers and copolymers of glycol monomethacrylates, polyol monomethacrylates, dihydroxyester monomethacrylates, acrylamide, methacrylamide, N-substituted acrylamide, N-substituted methacrylamide, N,N-disubstituted acrylamide, N,N-disubstituted methacrylamide, and

multiblock copolymers of acrylonitrile with acrylamide and/or acrylic acid;

said powdered hydrogel filler being present in an amount from about 10 to about 150 weight parts per 100 weight parts of silicone polymer.

4,696,975

ROOM TEMPERATURE-CURABLE RESIN COMPOSITION

Masataka Ooka, Nara; Yaeko Okuda, Hyogo, and Motoyasu Kunugiza, Nishinomiya, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Continuation of Ser. No. 576,892, Feb. 3, 1984, abandoned. This application Aug. 16, 1985, Ser. No. 766,679

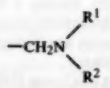
Claims priority, application Japan, Feb. 4, 1983, 58-17192

Int. Cl.[4] C08F *8/46;* **C08L** *63/10*

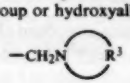
U.S. Cl. 525—113 **17 Claims**

1. A resin composition curable at room temperature, said composition consisting essentially of

(A) a polymer having both carboxyl and tertiary amino groups, the polymer being the reaction product of (a-1) a vinyl polymer having both carboxylic anhydride and carboxyl groups with (a-2) a compound having both at least one group containing an active hydrogen selected from the group consisting of hydroxyl, primary amino, secondary amino and thiol and at least one basic nitrogen atom-containing group selected from the group consisting of



wherein R^1 and R^2, which may be the same or different, each denote a C_{1-4} alkyl group or hydroxyalkyl group;



wherein R^3 denotes a C_{2-5} alkylene group or $—CH_2CH_2OCH_2CH_2$;

and

N-C_{1-2} alkylpiperazinyl group, and

(B) a polyepoxy compound.

4,696,976

VINYL URETHANE COMPOSITE POLYMER CONTAINING DISPERSED SOFT COPOLYMER PARTICLES

Gilbert B. Ellerbe, III, and Donald B. Parrish, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 7, 1984, Ser. No. 679,325

Int. Cl.[4] C08F *8/00;* **C08L** *75/00*

U.S. Cl. 525—126 **11 Claims**

1. A vinyl urethane composite polymer comprising the reaction product of a reaction mixture comprising

(a) a polymer polahl containing dispersed soft polymer particles, which dispersed particles have a T_g of less than 20° C.,

(b) a vinyl monomer having a boiling point above the temperature incurred in reacting said reaction mixure, and

(c) a polyisocyanate.

4,696,977

PROCESS FOR PREPARING NYLON BLOCK COPOLYMERS

Albert Y. Garner, Springfield; James D. Gabbert, Wilbraham, both of Mass., and Ross M. Hedrick, St. Louis, Mo., assignors to DSM Rim Nylon V.O.F., Geleen, Netherlands

Division of Ser. No. 658,958, Oct. 9, 1984, Pat. No. 4,587,305, which is a continuation-in-part of Ser. No. 560,644, Dec. 12, 1983, abandoned. This application Sep. 12, 1985, Ser. No. 775,544

Int. Cl.[4] C08L *23/26, 67/02, 71/02*

U.S. Cl. 525—184 **35 Claims**

1. A process for preparing a nylon block copolymer comprising:

bringing into reactive admixture:

(a) a first solution of an acyllactam and magnesium halide in epsilon-caprolactam formed by reaction of 2±0.2 equivalents of an acid halide functional material with one mole of a magnesium dilactam, said acid halide functional material comprising an oligomer or polymer containing at least one acid halide group per molecule; and

(b) a second solution of magnesium dilactam and epsilon-caprolactam containing sufficient magnesium dilactam to interact with the magnesium halide of the first solution to form a halomagnesium lactam and polymerize the epsilon-caprolactam monomer whereby a nylon block copolymer is obtained containing 10 to 90 wt. % of elastomeric segments provided by said acid halide functional material.

4,696,978

MODIFIED ACRYLIC POLYMERS

Barry D. Dean, Broomall, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 3, 1986, Ser. No. 825,302

Int. Cl.[4] C08L *33/12, 33/24*

U.S. Cl. 525—205 **10 Claims**

1. A moldable thermoplastic composition which is transparent upon molding comprising an alkyl methacrylate homo-or copolymer matrix resin and of an interpolymer consisting essentially of a methylmethacrylate/N-substituted maleimide copolymer and an alkyl acrylate homopolymer linked through a difunctional reactive monomer prepared in a one-step reaction by reacting together methylmethacrylate monomer, an alkyl acrylate monomer, and a difunctional reactive monomer bearing acrylate or methacrylate reactive groups, the inter-

polymer being present in an amount sufficient to improve the impact strength of molded alkyl methacrylate resin.

4,696,979

PROCESS FOR PRODUCING PROPYLENE COPOLYMER

Akinobu Shiga, Tokyo; Masahiro Kakugo, Chiba; Junpei Kozima, Chiba, and Kizuku Wakatsuki, Chiba, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 27, 1984, Ser. No. 686,864

Claims priority, application Japan, Dec. 27, 1983, 58-248520; Nov. 15, 1984, 59-241086

The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.

Int. Cl.[4] C08L *23/10, 23/14*

U.S. Cl. 525—247 **8 Claims**

1. A process for producing a crystalline propylene copolymer, which comprises carrying out in separate steps (A) and (B), (A) the polymerization of a vinyl cycloalkane selected from the group consisting of vinyl cyclopentane, vinyl-3-methyl cyclopentane, vinyl cyclohexane, vinyl-2-methyl cyclohexane, and vinyl norbornane and (B) the polymerization of monomer consisting essentially of propylene or consisting essentially of propylene with ethylene in a multiplicity of steps using a Ziegler-Natta catalyst comprising a titanium compound and organoaluminum compound to thereby produce a propylene copolymer containing 0.05 weight ppm to 10,000 weight ppm of the vinyl cycloalkane unit.

4,696,980

SULFONE ACTIVATED THIOETHER ADSORBENTS FOR THE SEPARATION OF PROTEINS AND THE LIKE

Jerker Porath, Bodalsvägen 4A, S-18136 Lidingö , Sweden

Filed Apr. 30, 1985, Ser. No. 729,344

Claims priority, application Sweden, May 17, 1984, 8402663

Int. Cl.[4] C08C *8/00;* **C07H** *5/00*

U.S. Cl. 525—326.1 **4 Claims**

1. Adsorbent for separation and immobilization, comprising a hydrophilic polymeric netting selected from the group consisting of agar, agarose, cellulose, polyacrylamide and polyvinyl alcohol, said netting comprising cross-links bound to said netting, said cross-links having the structure

$$Y—S—CH_2—CH_2—SO_2—CH_2—CH_2—X—,$$

where Y is selected from the group consisting of a heteroaromatic ring having at least one nitrogen atom, a phenyl group substituted with at least one nitro group, and a phenyl group substituted with at least one nitro group, and further substituted with alkyl, acyl, amino, or hydroxy groups; and X is selected from the group consisting of ether oxygen, thioether sulfur, and nitrogen.

4,696,981

METHOD OF MANUFACTURING POLYAMINO ACID WITH MICROWAVES

Kaoru Harada; Akira Shimoyama, both of Ibaraki, and Hiroji Mizumoto, Osaka, all of Japan, assignors to Diamond Shamrock Chemicals Company, Irving, Tex.

Filed Mar. 13, 1986, Ser. No. 839,353

Claims priority, application Japan, Mar. 25, 1985, 60-60219

Int. Cl.[4] C08G *69/10*

U.S. Cl. 525—328.2 **12 Claims**

1. A method of manufacturing anhydropolyaspartic acid (imide) by irradiating with microwaves, any one member selected from the group consisting of monoammonium, diammonium, monoamide, diamide and monoamideammonium salts of malic acid, maleic acid fumaric acid and mixtures thereof.

4,696,982

PROCESS FOR REMOVING RESIDUAL SALTS FROM EPOXY NOVOLACS

Lawrence E. Neil, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sep. 17, 1986, Ser. No. 908,539

Int. Cl.[4] C08G *59/06, 59/08*

U.S. Cl. 525—507 **15 Claims**

1. A method of separating dispersed salt ions soluble catalyst particles and solidified polymer particles from a flow of phenolic epoxy novolac or phenolic derivative epoxy resin intermediates by washing with water to selectively remove such impurities with the wash water comprising the steps of:

(a) through a water injection means, injecting a flow of water into the epoxy resin intermediate stream while forming the water flow into droplets for emulsifying in the epoxy resin stream wherein the droplets are sufficiently small so as to enhance diffusion between the phases; and

(b) passing the epoxy resin stream with emulsified water droplets through an electrostatic coalescer means to extract water from the epoxy resin stream wherein the water carries the impurities therewith to discharge a stream of washed phenolic epoxy novolac or phenolic derivative epoxy resin intermediates having reduced impurity content.

4,696,983

POLYMERIZATION REACTOR COATINGS AND USE THEREOF

Louis Cohen, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 16, 1985, Ser. No. 776,283

Int. Cl.[4] C08F *2/16, 2/18, 2/22, 20/06*

U.S. Cl. 526—62 **29 Claims**

12. A method for reducing polymer build-up on the internal surfaces of a polymerization vessel exposed to polymerization reaction mixtures comprising applying on said internal surfaces of the polymerization vessel exposed to contact with the polymerization reaction mixtures, prior to adding the polymerization reaction mixture to the polymerization vessel, a coating material comprising an anionic, water-soluble carboxyl polymer salt and surface active agent, said salt being an ammonium, amine or metal salt, said copolymer being greater than 10 to 100% salt, said surface active agent being a water-soluble anionic, cationic or non-ionic surfactant present in amount sufficient to provide a contact angle of less than 30°, adding said reaction mixture to the thus coated polymerization vessel and effecting polymerization thereof in the presence of said water-soluble coating material.

4,696,984

ISOPRENE POLYMERIZATION PROCESS

Antonio Carbonaro, Milan, and Domenico Ferraro, San Donato Milanese, both of Italy, assignors to Enichem Elastomeri, S.p.A., Palmero, Italy

Filed May 22, 1986, Ser. No. 866,147

Claims priority, application Italy, Jun. 5, 1985, 21037 A/85

The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.

Int. Cl.[4] C08F *4/52*

U.S. Cl. 526—98 **5 Claims**

1. A bulk polymerization process for preparing isoprene polymers and copolymers having a high cis content, high molecular weight and substantially no gel, wherein the respective monomer or monomers are brought into contact with a catalytic system comprising:

(a) at least one element of Group IIIB of the Periodic Table having an atomic number of between 57 and 71 or at least one compound thereof;

(b) at least one aluminum compound of the formula AlR_2R', wherein R is alkyl, cycloalkyl or alkylaryl, and R' is R or hydrogen;

(c) at least one compound selected from organic halogen derivatives, halides of elements able to exist in at least two valence states with the halide corresponding to a higher valence state than the minimum, halogens and hydrogen halide acids;

(d) at least one compound containing at least one salifiable hydroxyl group, said process comprising carrying out the reaction in the absence of diluents and at a ratio of component (b) to component (a) equal to or less than 20.

4,696,985

CATALYST COMPOSITION FOR POLYMERIZATION OF CYCLOOLEFINS

Andrea E. Martin, Avondale, Pa., assignor to Hercules Incorporated, Wilmington, Del.

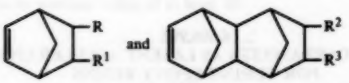
Continuation of Ser. No. 672,423, Nov. 16, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 845,482

Int. Cl.[4] C08F 4/62

U.S. Cl. 526—119 **16 Claims**

1. A method of forming a polymerizable cycloolefin solution comprising:

(a) providing cycloolefin defined by the following formulas:



wherein

R and R^1 are independently selected from hydrogen, alkyl groups of 1 to 20 carbon atoms, and saturated and unsaturated hydrocarbon cyclic groups formed by R and R^1 together with the two ring carbon atoms,

R^2 and R^3 are independently selected from hydrogen and alkyl groups containing 1 to 20 carbon atoms,

(b) providing WCl_6;

(c) providing an oxygen transfer agent;

(d) transferring a controlled proportion of oxygen from said oxygen transfer agent to said WCl_6 to form a mixture of WCl_4O and WCl_6, said mixture having substantial activity for the polymerization of said cycloolefin; and

(e) combining said mixture with said cycloolefin to form a polymerizable cycloolefin solution.

4,696,986

MODIFIER FOR LITHIUM CATALYSTS

Adel F. Halasa, Bath, and Robert E. Cunningham, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 12, 1986, Ser. No. 895,646

Int. Cl.[4] C08F 4/46

U.S. Cl. 526—181 **23 Claims**

1. A process for preparing a vinyl group containing polymer comprising polymerizing at least one diolefin monomer in the presence of a catalyst system which is comprised of (a) from 0.01 phm to 1 phm of at least one organolithium compound and (b) from 0.1 to about 40 moles of at least one trialkoxybenzene modifier selected from the group consisting of 1,2,3-trianloxybenzenes and 1,2,4-trialkoxybenzenes per mole of the organolithium compound, wherein the alkyl groups in said trialkoxybenzenes contain from 1 to about 10 carbon atoms.

4,696,987

PROCESS FOR THE PREPARATION OF POLYMERS OF VINYLPHOSPHONIC ACID IN PROTIC SOLVENTS

Walter Dürsch, Königstein/Taunus; Walter Herwig, Bad Soden am Taunus, and Friedrich Engelhardt, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 27, 1983, Ser. No. 565,862

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1982, 3248491

Int. Cl.[4] C08F 4/38, 4/34

U.S. Cl. 526—216 **6 Claims**

1. A process for the preparation of a polymer of vinylphosphonic acid in a protic diluent with the aid of a catalyst which forms free radicals, which comprises heating vinylphosphonic acid at temperatures of 40° to 130° C. in a total of 10 to 150% by weight of a protic diluent for a total of 4–60 hours in the presence of 1.0 to 5.5% by weight of an aliphatic peroxy-ester, an aliphatic diacyl peroxide or mixtures thereof which decompose by half in one hour at temperatures below 122° C.

4,696,988

PROCESS FOR PREPARATION OF REACTIVE POLYMERS AND POLYMERS PREPARED BY SAID PROCESS

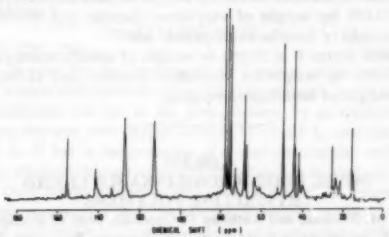
Toshinobu Higashimura; Mitsuo Sawamoto, both of Kyoto; Yoshiki Toyoshima, Ehime; Shuuichi Kanagawa, Osaka; Tsutomu Takahashi, and Noriaki Saito, both of Ehime, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 29, 1986, Ser. No. 868,386

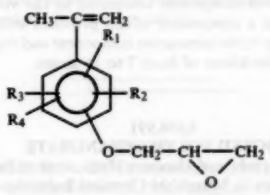
Claims priority, application Japan, May 30, 1985, 60-117190; Oct. 16, 1985, 60-230683; Oct. 17, 1985, 60-233001; Oct. 18, 1985, 60-234133; Feb. 25, 1986, 61-040926

Int. Cl.[4] C08F 2/06, 4/00, 224/00

U.S. Cl. 526—220 **6 Claims**



1. A process for preparing a reactive polymer having a molecular weight of from 500 to 50,000 by polymerizing a monomer comprising at least one isopropenylphenyl glycidyl ether represented by formula



(1)

wherein R_1, R_2, R_3 and R_4 are each a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, or a phenyl group, or in combination with other cation polymerizable unsaturated monomer to provide a reactive polymer of at least one unit of monomer comprising formula (1) to 99 units

of said unsaturated monomer by the use of at least one catalyst selected from halogens and hydrogen iodide in an amount of from 0.0001 to 0.1 mol per mol of the total monomer at a temperature ranging from −100° C. to 30° C. in the presence of at least one solvent selected from aromatic hydrocarbons, halogenated hydrocarbons and nitrohydrocarbons.

4,696,989

FLUORINE-CONTAINING ELASTOMERIC COPOLYMER

Masahiko Oka, Shiga; Yutaka Ueta; Hideo Kano, both of Osaka; Masayasu Tomoda, Shiga, and Shoji Kawachi, Hyogo, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Apr. 9, 1986, Ser. No. 849,734
Claims priority, application Japan, Apr. 10, 1985, 60-77097
Int. Cl.⁴ C08F *14/18, 14/22, 14/28*
U.S. Cl. 526—254 **6 Claims**

1. A copolymer comprising repeating units derived from tetrafluoroethylene, vinylidene fluoride and hexafluoropropylene in a molar ratio within an area defined on a tetrafluoroethylene, vinylidene fluoride and hexafluoropropylene ternary composition diagram by a hexagon with,

a first vertex A at 34.0% by weightof tetrafluoroethylene, 8.5% by weight of vinylidene fluoride and 57.5% by weight of hexafluoropropylene;

a second vertex B at 26.5% by weight of tetrafluoroethylene, 14.5% by weight of vinylidene fluoride and 59.0% by weight of hexafluoropropylene;

a third vertex C at 31.0% by weight of tetrafluoroethylene, 24.0% by weight of vinylidene fluoride and 45.0% by weight of hexafluoropropylene;

a fourth vertex D at 49.0% by weight of tetrafluoroethylene, 26.5% by weight of vinylidene fluoride and 24.5% by weight of hexafluoropropylene;

a fifth vertex E at 49.0% by weight of tetrafluoroethylene, 11.0% by weight of vinylidene fluoride and 40.0% by weight of hexafluoropropylene; and

a sixth vertex F at 50.0% by weight of tetrafluoroethylene, 9.0% by weight of vinylidene fluoride and 41.0% by weight of hexafluoropropylene.

4,696,990

NOVEL PHOTOCROSSLINKABLE LIQUID CRYSTALLINE POLYMERS

John M. Noonan, and Anthony F. Caccamo, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,416
Int. Cl.⁴ C08F *20/30*
U.S. Cl. 526—304 **7 Claims**

1. A photocrosslinkable liquid crystalline polymer comprising a vinyl backbone having from 60 to 100 mole percent of recurring pendant groups comprising an alkyl or alkoxy light-sensitive cinnamate component connected to the vinyl backbone through (a) a component which provides stiffness and rod-like character to the cinnamate component and (b) a spacer group having a backbone of from 7 to 14 atoms.

4,696,991

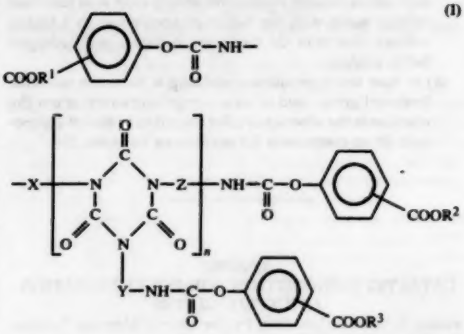
BLOCKED POLYISOCYANURATE

Yoshimichi Kobayashi, and Hisaharu Hotta, both of Yokohama, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Aug. 6, 1986, Ser. No. 893,822
Claims priority, application Japan, Sep. 3, 1985, 60-194188
Int. Cl.⁴ C08G *18/80*
U.S. Cl. 528—45 **3 Claims**

1. A blocked polyisocyanurate having the formula:

(I)



wherein each of X, Y and Z which may be the same or different, is a residue of a diisocyanate compound devoid of the isocyanate groups, each of R^1, R^2 and R^3 which may be the same or different, is a group selected from the group consisting of C_1–C_{20} alkyl, alkoxyalkyl, aryl, alkaryl and aralkyl, and n is an integer of from 1 to 10.

4,696,992

THIOL CARBAMATES AS LATENT ACCELERATORS FOR CURING EPOXY RESINS

Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Nov. 17, 1986, Ser. No. 931,325
Int. Cl.⁴ C08G *59/68*
U.S. Cl. 528—90 **8 Claims**

1. A process for accelerating the rate of cure of an epoxy resin formulation comprising including in the epoxy resin formulation a thiocarbamate cure accelerator.

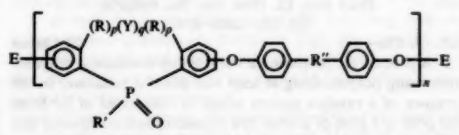
4,696,993

PHOSPHORUS-CONTAINING POLYARLENE ETHER

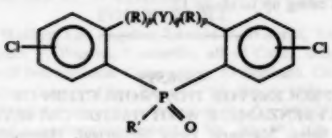
Werner Ude, Darmstadt-Arheilgen; Joachim Knebel, Darmstadt, and Guenter Schroeder, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jun. 4, 1986, Ser. No. 870,370
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521124
Int. Cl.⁴ C08G *79/04*
U.S. Cl. 528—167 **16 Claims**

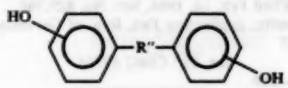
1. A method for making a resinous phosphorus-containing polyarylene ether of the formula



which method comprises polycondensing, at an elevated temperature, in the presence of an amount of alkali equivalent to the amount of halogen in the reagents, and for at least 10 hours, a bis-(chlorophenyl)phosphine oxide of the formula



with a bisphenol of the formula



wherein

R hydrogen, p is 1, and q is zero, or wherein p is zero, q is 1 and y is a single bond, or y is oxygen, sulfur, or a sulfonyl, carbonyl, methylene or isopropylidene bridge;

R′ is alkyl or aryl;

R″ is a single bond or R″ represents divalent oxygen, sulfur, or a divalent organic radical having from 5 to 15 carbon atoms and having free valences attached to quaternary carbon atoms;

E is an end group which is chlorine, hydrogen, hydroxyl, alkyl, alkoxy, aryl, aryloxy, acyl, or acyloxy group; and

n has an average value of at least 10.

4,696,994

TRANSPARENT AROMATIC POLYIMIDE

Kohei Nakajima; Kazuaki Nishio, and Hiroshi Watanabe, all of Ichihara, Japan, assignors to Ube Industries, Ltd., Ube, Japan

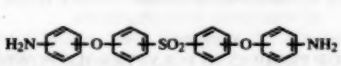
Filed Dec. 16, 1985, Ser. No. 809,528

Claims priority, application Japan, Dec. 14, 1984, 59-262976; Dec. 25, 1984, 59-272079

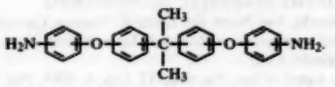
Int. Cl.⁴ C08L *79/08*

U.S. Cl. 528—176 **19 Claims**

1. A transparent aromatic polyimide produced by polymerization and imidation of an aromatic tetracarboxylic acid containing as a principal component biphenyltetracarboxylic acid and an aromatic diamine containing as a principal component bis(aminophenoxy-phenyl)sulfone of the formula (I) or bis-(aminophenoxy-phenyl)propane of the formula (II):



(I)



(II)

4,696,995

POLY(ESTER-CARBONATES) AND BLENDS BASED ON 3-METHYL-4-HYDROXY-BENZOIC ACID

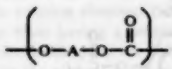
Edward N. Peters, Lenox, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Mar. 6, 1985, Ser. No. 708,731

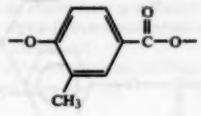
Int. Cl.⁴ C08G *63/62*

U.S. Cl. 528—206 **18 Claims**

1. A linear, high molecular weight, heat resistant thermoplastic copoly(ester-carbonate) resin comprising recurring carbonate units of the formula



in which A is a divalent aromatic radical of a dihydric phenol, and recurring ester units of the formula



the average number of repeating units being at least about 30.

4,696,996

PREPARATION OF POLYPHENYLENE ETHERS, AND AN APPARATUS FOR THIS PURPOSE

Hermann Brandt, Schifferstadt; Hermann Fischer, Limburgerhof; Hermann Dreher, Seeheim-Jugenheim; Eduard Heil, Limburgerhof; Juergen Hambrecht, Heidelberg; Herbert Naarmann, Wattenheim; Adolf Echte, Ludwigshafen; Hermann Gausepohl, Mutterstadt; Peter Siebel, Limburgerhof; Johann Swoboda, Ludwigshafen; Gerd Schwoebel, Wattenheim, and Albert Nikles, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 14, 1985, Ser. No. 797,884

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1984, 3442117

Int. Cl.⁴ C08G *65/38*

U.S. Cl. 528—214 **5 Claims**

1. A process for the preparation of a polyphenylene ether from a monohydric phenol having alkyl substituents in the two ortho-positions, but not in the para-position, by an oxidative coupling reaction with oxygen at from 15° to 50° C. and under from 1 to 10 bar in the presence of a catalyst complex and a solvent, wherein the conversion of the phenol is carried out in two or more reaction zones in which some or all of the solvent, the catalyst complex and the phenol is initially added to a reaction zone and is circulated by means of a conveying unit in such a way that the volume circulated per hour is from 5 to 50 times the total volume in the reaction zones, and about 60–100% of the stoichiometric amount of oxygen required in the oxidative coupling is introduced into the first reaction zone while from 0 to about 40% of the said stoichiometric amount is introduced into the second reaction zone, the heat of reaction produced in the reaction zones being removed in the reaction zone itself and/or downstream of this.

4,696,997

CYCLIC CARBONATE OLIGOMER COMPOSITION

Niles R. Rosenquist, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

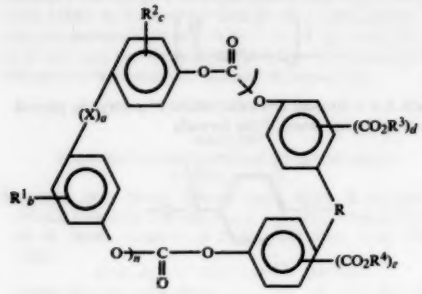
Filed Nov. 12, 1985, Ser. No. 796,984

Int. Cl.⁴ C08G *63/62*

U.S. Cl. 528—271 **4 Claims**

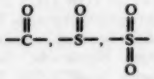
1. A composition comprising at least one oligmer of the formula

I.



wherein

X is selected from the group consisting of alkylene of two to twelve carbon atoms, inclusive, alkylidene of one to twelve carbon atoms, inclusive, cycloalkylene of four to twelve carbon atoms, inclusive, cycloalkylidene of four to twelve carbon atoms, inclusive, —S—, —O—, —S—S—,



a is zero or 1;

n is an integer of one to about fifteen;

R is alkylene of two to eight carbon atoms, inclusive, or alkylidene of one to eight carbon atoms, inclusive;

R^1 and R^2 are the same or different and are alkyl or one to four carbon atoms, inclusive or halo;

b and c are the same or different and are an integers of zero to four; and

R^3 and R^4 are the same or different and are alkyl of one to eight carbon atoms, inclusive, or phenyl; and

d and e are individually integers of 0, 1 or 2 with the proviso that d+e is at least one.

4,696,998

CYCLIC HETEROCARBONATES AND METHODS FOR THEIR PREPARATION AND USE

Daniel J. Brunelle; Thomas L. Guggenheim; Eugene P. Boden, all of Scotia; Thomas G. Shannon, Schenectady, and Joseph W. Gulles, Cohoes, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

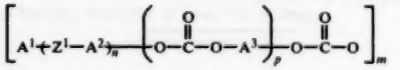
Filed Jul. 28, 1986, Ser. No. 890,053

Int. Cl.[4] C08G *63/62*

U.S. Cl. 528—272 **29 Claims**

1. A composition comprising cyclic heterocarbonate oligomers having the formula

(I)



wherein:

each of A^1, A^2 and A^3 is independently a divalent aromatic hydrocarbon or substituted aromatic hydrocarbon radical;

Z^1 is a divalent radical containing at least two non-carbon linking atoms not part of a carbonate radical;

m is from 1 to about 12;

n is from 1 to about 6; and

p is from 0 to about 6;

the total number of carbonte moieties in each of said oligomers being up to about 12.

4,696,999

PROCESS FOR THE PRODUCTION OF POLYBENZAMIDE WITH HALIDE CATALYST

Manfred Spies, Marburg; Peter Strohriegl, Hummeltal, and Walter Heitz, Kirchhain, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 829,766

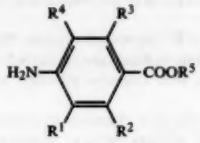
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, 3505903

Int. Cl.[4] C08G *69/08*

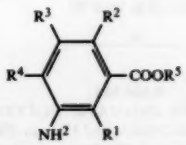
U.S. Cl. 528—319 **3 Claims**

1. A process for the production of a polybenzamide comprising polycondensation of aminobenzoic acid corresponding to formula (Ia) or (Ib) or a mixture of both

(Ia)



(Ib)



in which

R^1 to R^4 represent halogen, hydrogen, C_1–C_{20} alkyl, C_5–C_{10} cycloalkyl, C_6–C_{14} aryl or C_7–C_{20} aralkyl linked to the benzene ring directly or via O, N, P or S; and

R^5 represents C_1–C_8 alkyl, C_5–C_{10} cycloalkyl, C_6–C_{14} aryl, C_7–C_{15} aralkyl or hydrogen,

wherein the polycondensation is conducted in the presence of at least one halide of an element from the 3rd or 4th main group or the 4th secondary group of the Periodic Table of the elements according to Mendeleyev.

4,697,000

PROCESS FOR PRODUCING POLYPYRROLE POWDER AND THE MATERIAL SO PRODUCED

Edward F. Witucki, Van Nuys, and Leslie F. Warren, Camarillo, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 646,717, Sep. 4, 1984, Pat. No. 4,617,228. This application Jul. 8, 1986, Ser. No. 883,202

Int. Cl.[4] C07D *207/30*; C08G *73/20*; H01B *1/12*

U.S. Cl. 528—423 **15 Claims**

1. A process for producing electrically conductive polypyrrole powder which comprises:

treating a liquid pyrrole with a solution of a strong oxidant capable of oxidizing pyrrole to a pyrrole polymer, said strong oxidant being a cation selected from the group consisting of Fe^{3+}, Cu^{2+}, Ce^{4+}, NO^+, NO_2^+ and $(C_6H_5)_3C^+$ cations, and

oxidizing said pyrrole by said strong oxidant in the presence of a substantially non-nucleophilic anion, and precipitating a conductive polypyrrole powder.

11. An electrically conductive polypyrrole powder produced by the process of claim 1.

4,697,001

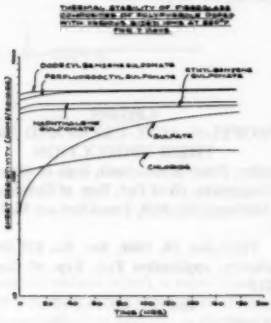
CHEMICAL SYNTHESIS OF CONDUCTING POLYPYRROLE

John A. Walker, Los Angeles; Edward F. Witucki, Van Nuys, and Leslie F. Warren, Camarillo, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 646,717, Sep. 4, 1984, Pat. No. 4,617,228, and a continuation-in-part of Ser. No. 883,202, Jul. 8, 1986, and a continuation-in-part of Ser. No. 883,260, Jul. 8, 1986. This application Oct. 9, 1986, Ser. No. 916,917

Int. Cl.[4] C07D 207/30; C08G 73/20; H04B 1/12

U.S. Cl. 528—423 21 Claims



1. A process for producing electrically conductive polypyrrole which comprises:

treating a liquid pyrrole with a solution of a strong oxidant capable of oxidizing pyrrole to a pyrrole polymer, said strong oxidant being a cation selected from the group consisting of Fe^{3+}, Cu^{2+}, Ce^{4+}, and $(C_6H_5)_3C^+$ cations, oxidizing said pyrrole by said strong oxidant in the presence of a dopant anion selected from the group consisting of (1) alkyl and aryl sulfonates and (2) fluorinated carboxylates, and

precipitating a conductive polypyrrole solid.

15. An electrically conductive polypyrrole produced by the process of claim 1.

4,697,002

CALCITONIN GENE RELATED PEPTIDE ANALOGS WITH AMINO ACID SUBDSTITUENTS AT THE PENULTIMATE POSITION 36

Tomas G. Kempe, 16604 Windermere Pl., Minnetonka, Minn. 55345

Filed Dec. 23, 1985, Ser. No. 812,900

Int. Cl.[4] C07K 7/10

U.S. Cl. 530—324 5 Claims

1. [Ser[36]] human calcitonin gene-related peptide.

4,697,003

METHOD OF PREPARING ALPHA-1-PROTEINASE INHIBITOR

Michael H. Coan, El Cerrito, Calif., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Nov. 1, 1985, Ser. No. 793,807

Int. Cl.[4] C07G 7/00

U.S. Cl. 530—380 18 Claims

1. A method for separating alpha-1-proteinase inhibitor from an aqueous solution of plasma proteins containing alpha-1-proteinase inhibitor selected from the group consisting of Cohn Effluent II+III, Cohn Effluent I and cryosupernatant solution which comprises the steps of:

(a) treating the aqueous solution to lower the concentration of salts therein to about 0.02M or below by at least one means selected from diafiltration and gel filtration;

(b) contacting the solution obtained from step (a) with an anion exchange resin having a selective affinity for the alpha-1-proteinase inhibitor in the solution to selectively bind to the resin the alpha-1-proteinase inhibitor and to allow the plasma proteins which do not bind to the resin to elute through the resin into a first eluate;

(c) contacting the anion exchange resin having selectively bound thereto alpha-1-proteinase inhibitor obtained from step (b) with an eluant having sufficient ionic strength to displace the alpha-1-proteinase inhibitor from the resin into a second eluate; and

(d) recovering alpha-1-proteinase inhibitor from the second eluate obtained from step (c).

4,697,004

PROCESS FOR PREPARING LOW PHYTATE SOY PROTEIN ISOLATE

Gabor Puski, Newburgh; Grant H. Hartman, Jr., Evansville, and Robert D. Talbott, Newburgh, all of Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Sep. 6, 1985, Ser. No. 773,481

Int. Cl.[4] A23J 1/14

U.S. Cl. 530—378 23 Claims

1. A process for preparing a soy protein isolate with significantly reduced aluminum content and substantially free of phytate which comprises treating a defatted soybean raw material containing soy protein by forming a slurry with an aqueous medium at a pH within the range of pH 8 to 10 and at a temperature above 65° C. for a period of time sufficient to solubilize the soy protein; but reduce extraction of phytates; separating said slurry into an insoluble fraction containing a substantial portion of the polysaccharides and insoluble phytates and a soluble fraction which includes the solubilized soy protein; adjusting the pH of said soluble fraction above the isoelectric range to 5.0 to 5.5 to precipitate the soy protein and thereby produce a whey fraction containing soluble phytate and a soy protein solids fraction having a phytate concentration below 0.3%.

4,697,005

1-FLUORO, 4-FLUORO, AND 1,4-DIFLUORO ANTHRACYCLINE ANTICANCER ANTIBIOTICS

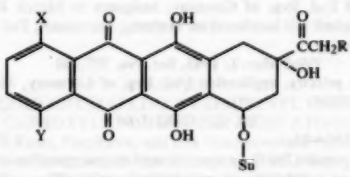
John S. Swenton; Gary W. Morrow, and Waldemar Priebe, all of Columbus, Ohio, assignors to Ohio State University Research Foundation, Columbus, Ohio

Filed Mar. 20, 1985, Ser. No. 714,131

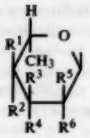
Int. Cl.[4] C07H 15/24

U.S. Cl. 536—6.4 13 Claims

1. A compound of the formula (I)



where R is hydrogen or hydroxyl, one of X and Y is fluorine and the other is hydrogen or both X and Y are fluorine, and S_u is a hydrogen atom or a sugar moiety represented by the formula



wherein one of R^1 and R^2 is hydrogen and the other is hydroxy, acyloxy having 2 to 4 carbon atoms or a halogen atom; one of R^3 and R^4 is hydrogen and the other is amino; and R^5 and R^6 are hydrogen; and pharmaceutically acceptable acid addition salts thereof.

4,697,006

MODIFIED OLIGOSACCHARIDES USED AS SUBSTRATE FOR MEASURING α-AMYLASE ACTIVITY

Tokuji Ikenaka, Sakai, and Kaoru Omichi, Toyonaka, both of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 532,099, Sep. 14, 1983, Pat. No. 4,622,295. This application Sep. 15, 1986, Ser. No. 907,358

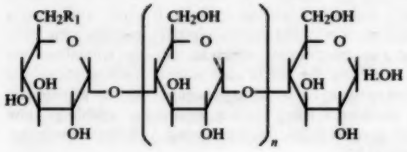
Claims priority, application Japan, Sep. 16, 1982, 57-161457; Jul. 28, 1983, 58-138344

Int. Cl.[4] C08B *37/00*; C12Q *1/40, 1/54*; C12N *9/26*

U.S. Cl. 536—17.2 **4 Claims**

1. A modified oligosaccharide represented by the formula:

(I)



wherein R_1 is a 2-aminopyridyl group, a 3-aminopyridyl group, an anilino group, a methylanilino group, a hydroxyanilino group or a carboxyphenylamino group; and n is an integer of 2 to 5.

4,697,007

PREPARATION OF MICROCRYSTALLINE TRIACETYLCELLULOSE

Georg Seitz, Darmstadt, and Rainer Wernicke, Neu-Isenburg, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Mar. 1, 1985, Ser. No. 707,130

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1984, 3407596

Int. Cl.[4] C08B *3/06*

U.S. Cl. 536—83 **6 Claims**

1. In a process for the preparation of microcrystalline triacetylcellulose comprising acetylating microcrystalline cellulose in the presence of an acid catalyst, the improvement which comprises employing a catalytic amount of at least one perfluoralkanesulfonic acid having 1–8 carbon atoms as the catalyst.

4,697,008

PRODUCTION OF WATER-INSOLUBLE ALKALI METAL SALTS OF CARBOXYALKYL CELLULOSE

Hideharu Asano, Nakakubiki, and Hisakazu Senda, Joyo, both of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Dec. 11, 1986, Ser. No. 940,420

Claims priority, application Japan, Dec. 13, 1985, 60-281612

Int. Cl.[4] C08B *11/20*

U.S. Cl. 536—89 **11 Claims**

1. A method of producing a water-insoluble alkali metal salt of carboxyalkyl cellulose which comprises reacting a water-soluble alkali metal salt of carboxyalkyl cellulose with an aliphatic hydroxycarboxylic acid.

4,697,009

N-SILYLPROPYL-N'-ACYL-UREAS AND PROCESS FOR THEIR PRODUCTION

Ulrich Deschler; Peter Kleinschmit, both of Hanau, and Rudolf Michel, Freigericht, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 18, 1986, Ser. No. 875,867

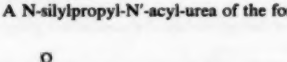
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524215

Int. Cl.[4] C07F *7/10*

U.S. Cl. 540—487 **16 Claims**

1. A N-silylpropyl-N'-acyl-urea of the formula:

(III)

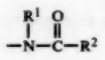


in which

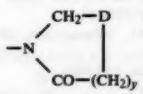
x is 0, 1, or 2

R is C_1–C_6 alkyl, (2'-methoxy)ethyl or aryl,

A is



where R^1 is C_1–C_6 alkyl, R^2 is hydrogen, C_1–C_6 alkyl or A is



where y is 1, 2, or 3 and D is —CH_2—, or >NR^1.

4,697,010

CATALYZED OXIME CONVERSIONS

Patrick E. McMahon, Wheaton, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jun. 5, 1986, Ser. No. 870,822

Int. Cl.[4] C07D *201/04*

U.S. Cl. 540—536 **3 Claims**

1. A process comprising reacting cyclohexanone oxime in with an inert diluent over a catalyst composition comprising a HAMS-1B crystalline borosilicate molecular sieve incorporated into an inorganic matrix to form caprolactam.

4,697,011

N-FLUORO-N-PERFLUOROMETHYL SULFONAMIDES

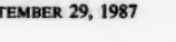
Darryl D. DesMarteau, Clemson, S.C., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 758,604, Jul. 24, 1985. This application Jul. 18, 1986, Ser. No. 889,034

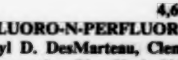
Int. Cl.[4] C07C *143/72, 143/74*

U.S. Cl. 540—544 16 Claims

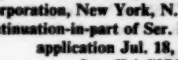
1.



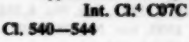
I



II



III



IV

wherein

R is a hydrocarbon radical which is substituted or is unsubstituted and which is a C_{1-30} branched or straight chain alkyl, C_{3-30} cycloalkyl, or aryl (C_{1-10} alkyl) or aryl group wherein aryl and aryl are C_{6-14} arylene,

R_f is a perfluorinated radical which is C_{2-30} branched or straight chain alkyl, C_{3-30} cycloalkyl, or aryl (C_{1-10} alkyl) or aryl group wherein aryl and aryl are C_{6-14} arylene,

R'_f is a perfluorinated radical which is $(CF_2)_n$ wherein n is 1 to 4,

a is 0 or 1 and

m is 1 or 2, n is 0 or 1, p is 0 or 1 and m+n+p=2.

4,697,012

MORPHOLINO PYRIDYL THIAZOLE COMPOUND

David A. Boulton, Edison; Ihor E. Kopka, Newark; Vernon L. Moore, Scotch Plains, and Arsenio A. Pessolano, Colonia, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 25, 1984, Ser. No. 634,094

Int. Cl.[4] C07D *413/14*

U.S. Cl. 544—124 1 Claim

1. The compound

2-benzyl-4-[2-(morpholino)-4-pyridyl]thiazole.

4,697,013

CONDENSED AS-TRIAZINE DERIVATIVES

András Messmer; Sándor Bátori; György Hajós; Pál Benkó; László Pallos; Lujza Petöcz; Grasser Katalin, and Ibolya Kosóczky, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Filed Sep. 20, 1984, Ser. No. 652,613

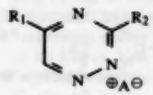
Claims priority, application Hungary, Sep. 20, 1983, 2251/3241/83

The portion of the term of this patent subsequent to Dec. 6, 2000, has been disclaimed.

Int. Cl.[4] C07D *253/08*

U.S. Cl. 544—183 3 Claims

1. A compound of the formula I



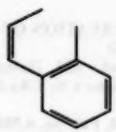
I

Z

and isomers thereof wherein

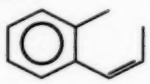
R_1 is C_{1-10} alkyl or phenyl or naphthyl, the two latter groups being optionally substituted by one or more halogen, nitro, amino, hydroxy, C_{1-4} alkyl and/or C_{1-4} alkoxy substituents is halogen,

Z is buta-1,3-dienyl or a group of the formula a



a

or b



b

and

A^- is an anion.

4,697,014

CATALYTIC PARTIAL CYCLOTRIMERIZATION OF POLYISOCYANATES AND PRODUCT THEREOF

Jean Robin, Lyons, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Mar. 25, 1986, Ser. No. 843,512

Claims priority, application France, Mar. 25, 1985, 85 04608

Int. Cl.[4] C07D *251/34;* C08G *18/02;* C08F *4/16*

U.S. Cl. 544—193 14 Claims

1. A process for the preparation of a storage-stable polyisocyanurate-polyisocyanate, comprising catalytically cyclotrimerizing an aliphatic or cycloaliphatic polyisocyanate in the presence of a catalytically effective amount of an aminosilyl catalyst, and further comprising terminating the cyclotrimerization reaction when a predetermined desired amount of isocyanurate groups has been reached, by adding to the reaction mixture a reaction terminating amount of water.

14. The product of the process as defined by claim 1.

4,697,015

LIQUID CRYSTALLINE PYRIMIDINYL PHENYL CARBOXYLIC ACID ESTER DERIVATIVES

Mitsuru Kano, Furukawa, and Jun Nakanowatari, Miyagi, both of Japan, assignors to Alps Electric Co., Ltd., Japan

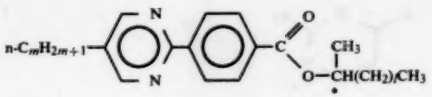
Filed Oct. 2, 1986, Ser. No. 914,284

Claims priority, application Japan, Oct. 4, 1985, 60-221552

Int. Cl.[4] C07D *239/26*

U.S. Cl. 544—335 5 Claims

1. A liquid crystalline compound represented by the following general formula:



(I)

where m and l represent individually integers within a range as: $6 \leqq m \leqq 14$ and $1 \leqq l \leqq 5$, the symbol * reresents an asymmetric carbon atom and the compound is required to be optically active.

4,697,016

INTERMEDIATES FOR THE PREPARATION OF A CARBOXYLIC ACID

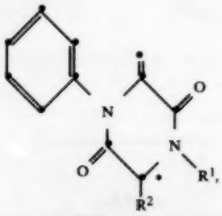
Achim Roloff, Rheinfelden, Switzerland, and Heinz W. Gschwend, New Providence, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 664,916, Oct. 26, 1984, Pat. No. 4,595,766. This application Feb. 14, 1986, Ser. No. 829,336

Int. Cl.[4] A61K *241/18, 471/04, 487/04, 487/14*

U.S. Cl. 544—344 **7 Claims**

1. A compound of the formula



II

wherein R^1 is hydrogen, lower alkyl or aryl-lower alkyl, R^2 is lower alkyl or lower alkyl which is substituted by lower alkoxy, lower alkylthio, aryl or lower alkoxyaryl, or is aryl, or wherein R^1 and R^2, when taken together, are C_2–C_6 alkylene which may be substituted by lower alkoxy or fused to a 5- to 7-membered saturated, partly saturated or aromatic carbocyclic ring, and wherein the symbol * denotes a carbon atom which is either in the S or in the R configuration.

4,697,017

PROCESS FOR THE PREPARATION OF 2-BROMO-α-ERGOCRYPTINE

Gábor Megyeri; Tibor Keve; János Galambos; Lajos Kovács, Jr.; Béla Stefkó; Erik Bogsch, and Ferenc Trischler, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest, Hungary

Filed May 30, 1986, Ser. No. 869,203

Claims priority, application Hungary, Jun. 12, 1985, 2300

Int. Cl.[4] C07D *519/02*

U.S. Cl. 544—346 **2 Claims**

1. A process for the preparation of 2-bromo-α-ergocryptine and its acid addition salts by brominating α-ergocryptine, which comprises carrying out the bromination at room temperature by using a dimethylsulphoxide-hydrogen bromide mixture containing no more than 0.02% of water and, if desired, converting the thus-obtained 2-bromo-α-ergocryptine to an acid addition salt by using a method known per se.

4,697,018

9-JULOLIDINYL DERIVATIVES AND PROCESS OF PREPARING THEM

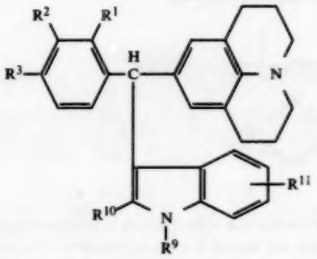
Paul J. Schmidt, Sharonville, and William M. Hung, Cincinnati, both of Ohio, assignors to The Hilton-Davis Chemical Co., Cincinnati, Ohio

Division of Ser. No. 290,657, Aug. 6, 1981, Pat. No. 4,403,791. This application Sep. 30, 1985, Ser. No. 781,589

Int. Cl.[4] C07D *455/02, 209/02*

U.S. Cl. 546—94 **7 Claims**

1. A [(2-R^1-3-R^2-4-R^4-phenyl)(9-julolidinyl](1-R^9-2-R^{10}-5/6-R^{11}-indol-3-yl)]methane having the formula



wherein:

R^1 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo or dialkylamino in which alkyl is non-tertiary C_1 to C_4 alkyl;

R^2 represents hydrogen or nitro;

R^3 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo, nitro, dialkylamino or N-alkylbenzylamino in which alkyl is non-tertiary C_1 to C_4 alkyl and benzyl may be substituted in the benzene ring by one or two of halo or alkyl;

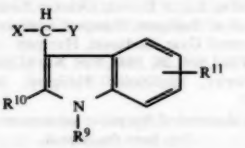
R^9 represents hydrogen, C_1 to C_{18} alkyl, C_2 to C_4 alkenyl, benzyl or benzyl substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

R^{10} represents hydrogen, C_1 to C_3 alkyl, phenyl or

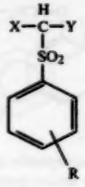
in which B" represents hydrogen, C_1 to C_{18} alkyl, C_2 to C_8 alkenyl, benzyl or benzyl substituted in the benzene ring by C_1 to C_{12} alkyl, halo or C_1 to C_8 alkoxy; and

R^{11} represents one or two of hydrogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halo or nitro.

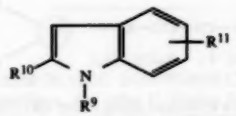
3. A process for preparing a [(X)(Y)(1-R^9-2-R^{10}-5/6-R^{11}-indol-3-yl)]methane having the formula



which comprises interacting a [(X)(Y)(R-phenylsulfonyl)]methane having the formula

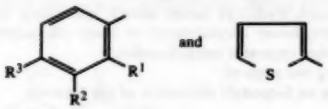


with an indole of the formula



in the presence of an alkaline or an acid catalyst wherein:

X represents a moiety selected from the class having the formulas



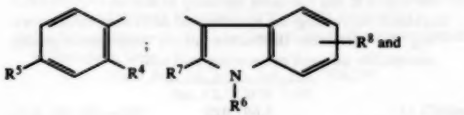
in which

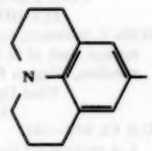
R^1 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo or dialkylamino in which alkyl is non-tertiary C_1 to C_4 alkyl,

R^2 represents hydrogen or nitro; and

R^3 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo, nitro, dialkylamino or N-alkylbenzylamino in which alkyl is non-tertiary C_1 to C_4 alkyl and benzyl may be substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

Y represents a moiety selected from the group having the formulas





in which

R^4 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo or dialkylamino in which alkyl is non-tertiary C_1 to C_4 alkyl,

R^5 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo, dialkylamino or N-alkylbenzylamino in which alkyl is a non-tertiary C_1 to C_4 alkyl and benzyl may be substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl,

R^6 represents hydrogen, non-tertiary C_1 to C_{18} alkyl, C_2 to C_4 alkenyl, benzyl or benzyl substituted in the benzene ring by one or two of C_1 to C_3 alkyl or halo,

R^7 represents hydrogen, C_1 to C_3 alkyl or phenyl, and

R^8 represents one or two of hydrogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halo or nitro;

R^9 represents hydrogen, non-tertiary C_1 to C_{18} alkyl, C_2 to C_4 alkenyl, benzyl or benzyl substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

R^{10} represents hydrogen, C_1 to C_3 alkyl, phenyl or carboxy;

R^{11} represents one or two of hydrogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halo or nitro; and

R represents one or two of hydrogen, non-tertiary C_1 to C_{12} alkyl, C_1 to C_3 alkoxy, halo, nitro or acetamido.

4,697,019

AZABICYCLO COMPOUNDS, USEFUL AS INTERMEDIATES

Francis D. King, Newport, England, assignor to Beecham Group p.l.c., Epsom, England

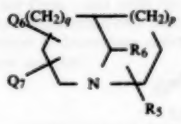
Division of Ser. No. 484,317, Apr. 12, 1983, Pat. No. 4,612,319. This application Mar. 21, 1986, Ser. No. 824,205

Claims priority, application United Kingdom, Apr. 14, 1982, 8210847; Apr. 14, 1982, 8210848

Int. Cl.[4] C07D *221/04, 223/14*

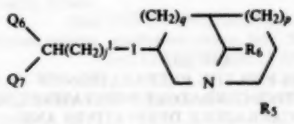
U.S. Cl. 546—112 **11 Claims**

1. A compound of formula (XXII):



(XXII)

or a compound of formula (XXIII):



(XXIII)

wherein

in formula (XXIII), j^1-1 is 1 to 4; and

Q_6 and Q_7 are on the same carbon atom; and

wherein,

in formulae (XXII) and (XXIII),

Q_6 is NH_2 and Q_7 is H and either p is 0 to 2 and q is 1; or p is 1 and q is 0 to 3; and

one of R_5 and R_6 is hydrogen, C_{1-6} alkyl, phenyl or phenyl —C_{1-3} alkyl, which phenyl moieties may be substituted by C_{1-6} alkyl, C_{1-6} alkoxy, CF_3 or halogen;

and the other of R_5 and R_6 is hydrogen or C_{1-6} alkyl.

4,697,020

DERIVATIVES OF 2,4-THIAZOLIDINEDIONE

Angelo Storni, Allschwil, and Alex Meisels, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 754,566, Jul. 12, 1985, abandoned, which is a division of Ser. No. 393,907, Jun. 30, 1982, abandoned, which is a continuation of Ser. No. 45,158, Jun. 4, 1979, abandoned, which is a continuation of Ser. No. 639,025, Dec. 9, 1975, abandoned, which is a continuation of Ser. No. 441,680, Feb. 11, 1974, abandoned. This application Oct. 9, 1986, Ser. No. 918,584

Claims priority, application Switzerland, Feb. 13, 1973, 2016/73; Nov. 13, 1973, 15960/73; Nov. 13, 1973, 15961/73

Int. Cl.[4] C07D *233/28*; A61K *31/425*

U.S. Cl. 548—184 **4 Claims**

1. A member selected from the group consisting of (1) a compound which is the 2,2'-azine of 3-(2-methyl-allyl)-5-methyl-2,4-thiazolidinedione and of 3-methyl-5-hydroxy-2,4-thiazolidinedione, (2) a compound which is the 2,2'-azine of 3-(2-methyl-allyl)-5-hydroxy-2,4-thiazolidinedione and of 3-methyl-5-hydroxy-2,4-thiazolidinedione, (3) a compound which is 3-allyl-3'-methyl-5,5'-dihydroxy-2,2'-dithio-1,1'-bihydantoin.

4,697,021

1,6-DIHYDRO-6-OXO-3-PYRIDINECARBONITRILES, INTERMEDIATES FOR CARDIOTONIC AGENTS

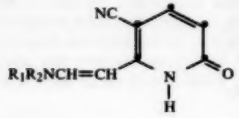
George Y. Lesher, Schodack, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 824,491, Jan. 31, 1986, Pat. No. 4,657,915, which is a continuation-in-part of Ser. No. 737,129, May 23, 1985, abandoned, and a continuation-in-part of Ser. No. 816,591, Jan. 6, 1986, Pat. No. 4,634,772, and a continuation-in-part of Ser. No. 811,040, Dec. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 765,900, Aug. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 695,603, Jan. 28, 1985, abandoned. This application Dec. 15, 1986, Ser. No. 941,890

Int. Cl.[4] C07D *211/84*

U.S. Cl. 546—288 **4 Claims**

1. 2-[2-(di-lower-alkylamino)ethenyl]-1,6-dihydro-6-oxo-3-pyridinecarbonitrile having the formula III



III

and acid-addition salt thereof.

4,697,022

PROCESS FOR THE PREPARATION OF OPTICALLY-ACTIVE CARBAZOLE DERIVATIVES, NEW R- AND S-CARBAZOLE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS

Herbert Leinert, Heppenheim, Fed. Rep. of Germany, assignor to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

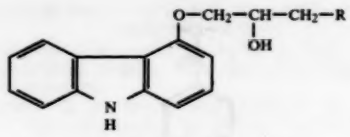
Filed May 21, 1984, Ser. No. 612,255

Claims priority, application Fed. Rep. of Germany, May 26, 1983, 3319027

Int. Cl.[4] C07D *209/88*

U.S. Cl. 548—444 **2 Claims**

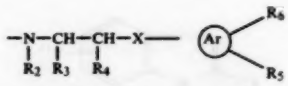
1. A process for the preparation of an R-carbazole derivative of the formula:



(I)

or its pharmacologically acceptable salts wherein

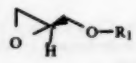
R is an amino group, an amino group substituted by a lower alkyl radical, or the radical:



in which R_2 is a hydrogen atom, lower alkyl, benzyl, phenylethyl or phenylpropyl; R_3 is a hydrogen atom or lower alkyl; R_4 is a hydrogen atom or lower alkyl; X is a valency bond, a $—CH_2—$ group, or an oxygen or sulphur atom; Ar is a phenyl, naphthyl, indanyl, tetrahydronaphthyl or pyridyl; and R_5 and R_6, which can be the same or different, are hydrogen or halogen atoms, lower alkyl, aminocarbonyl, hydroxyl, lower alkoxy, benzyloxy, lower alkylthio, lower alkysulphinyl or lower alkysulphonyl or together represent methylenedioxy;

comprising the steps of

reacting an S-epoxide derivative of the formula:



(II)

in which R_1 is the residue of a substituted sulphonic acid derivative selected from the group consisting of methanesulphonic acid, p-toluenesulphonic acid and benzenesulphonic acid, with 4-hydroxycarbazole in the presence of an organic solvent selected from the group consisting of dimethylsulfoxide, dimethyl formamide and dioxane in an alkaline medium; and

reacting the R-4-(2,3-epoxypropoxy)-carbazole obtained, with ammonia or a substituted amine of the formula RH, in which R has the same meaning as above;

thereafter recovering the R-carbazole derivative or converting the carbazole derivative into a pharmacologically acceptable salt and recovering said salt.

4,697,023

PROCESS FOR THE PREPARATION OF OXY-DIPHTHALIC ANHYDRIDES

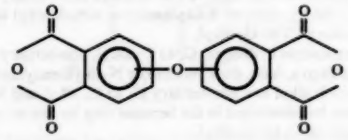
Willis T. Schwartz, Grand Island, and Joseph A. Pawlak, Cheektowaga, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 3, 1986, Ser. No. 914,955

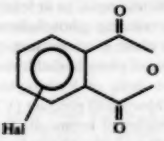
Int. Cl.[4] C07D *307/89*

U.S. Cl. 549—241 **24 Claims**

1. A process for the preparation of a diphthalic ether dianhydride of the formula



comprising reacting a halo-phthalic anhydride of the formula



where Hal is F, Cl, Br or I, with water and an alkali metal compound selected from the group consisting of KF, CsF, and K_2CO_3 in the presence of polar, aprotic solvent.

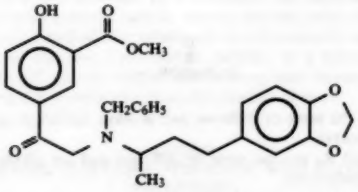
4,697,024

MEDROXALOL INTERMEDIATES

Richard E. Donaldson, and John F. Hoops, both of Midland, Mich., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Nov. 24, 1986, Ser. No. 933,821
Int. Cl.[4] C07D 317/54
U.S. Cl. 549—444 2 Claims

1. A compound, methyl 5-((4-(3,4-methylenedioxyphenyl)-N-benzyl-2-butylamino)acetyl)salicylate, having the structural formula:



or an acid addition salt thereof.

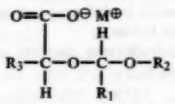
4,697,025

CARBOXYLATE SALT COMPOUND AND METHOD FOR FLAVORING FOODSTUFFS AND TOBACCO

Brian Byrne, Mahwah, N.J., assignor to Hercules Incorporated, Wilmington, Del.

Filed Sep. 16, 1985, Ser. No. 776,300
Int. Cl.[4] C07F 5/06
U.S. Cl. 556—183 11 Claims

1. A compound of the general formula:



where R_1 is an alkyl having from 1 to 14 carbons, alkenyl having from 2 to 14 carbons, cycloalkyl, cycloalkenyl, aryl, or furyl having from 4 to 14 carbons; R_2 is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, or cycloalkynyl of from 1 to 7 carbons, aryl or oxyaryl of from 5 to 18 carbons, or a cycloaliphatic ether of from 5 to 6 carbons; and R_3 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, or cycloalkynyl of from 1 to 7 carbons, aryl, or oxyaryl of from 5 to 18 carbons, or a cycloaliphatic ether of from 5 to 6 carbons, or a radical of the general formula:

where R_4 and R_5 independently are hydrogen or alkyl of from 1 to 6 carbons; and R_6 is aryl, alkylaryl, aryloxy, alkoxy, cyclic acetal of from 3 to 7 carbons, dioxyalkyenyl ether of from 4 to 8 carbons; and M is consumable cation other than hydrogen ion.

4,697,026

ACRYL FUNCTIONAL SILICONE COMPOUNDS

Chi-long Lee, and Michael A. Lutz, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jan. 6, 1986, Ser. No. 816,477
Int. Cl.[4] C07F 7/10
U.S. Cl. 556—418 26 Claims

1. An acryl functional silicone compound consisting essentially of at least one silicon atom having an acryl functional radical bonded to the silicon atom through a silicon-carbon bond, where the acryl functional radical contains at least one carbon-nitrogen-carbon bond and an acrylate, methacrylate, acrylamide, or methacrylamide group, any other groups bonded to the silicon atom being monovalent hydrocarbon radicals, fluorinated alkyl radicals, hydrolyzable groups whose hydrolyzed groups do not form a salt with the nitrogen atoms, divalent oxygen atoms which bond two silicon atoms in an Si—O—Si linkage, divalent hydrocarbon radicals bonding at least two silicon atoms together, silicon atoms which are present and which do not have an acryl functional radical bonded thereto can have bonded thereto monovalent hydrocarbon radicals, fluorinated alkyl radicals, hydrolyzable groups whose hydrolyzed groups do not form a salt with the nitrogen atoms, divalent oxygen atoms which bond radicals, fluorinated alkyl radicals, hydrolyzable groups whose hydrolyzed groups do not form a salt with the nitrogen atoms, divalent oxygen atoms which bond two silicon atoms in an Si—O—Si linkage, divalent hydrocarbon radicals bonding at least two silicon atoms together, silicon atoms which are present and which do not have an acryl functional radical bonded thereto can have bonded thereto monovalent hydrocarbon radicals, fluorinated alkyl radicals, hydrolyzable groups whose hydrolyzed groups do not form a salt with the nitrogen atoms, divalent oxygen atoms which bond two silicon atoms in an Si—O—Si linkage, divalent hydrocarbon radicals bonding at least two silicon atoms together.

4,697,027

METHOD FOR PURIFYING ALKOXYSILANE

Junpei Sugihara; Takeshi Imai; Shuzo Toida, and Ikuzo Takahashi, all of Chiba, Japan, assignors to Toray Silicon Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1986, Ser. No. 923,378
Claims priority, application Japan, Nov. 14, 1985, 60-255469
Int. Cl.[4] C07F 7/08, 7/18
U.S. Cl. 556—466 14 Claims

1. A method for purifying an alkoxysilane having the general formula

$$R_mSi(OR^1)_{4-m}$$

wherein R is a hydrogen atom, C_{1-8} substituted or unsubstituted monovalent hydrocarbon group; R^1 is a C_{1-8} substituted or unsubstituted monovalent hydrocarbon group; and m is an integer having a value of 0, 1, 2, or 3, the method comprising:

(i) heating the alkoxysilane in the presence of a treating agent selected from a group which consists of acid clays and metal halides;

(ii) contacting the alkoxysilane with a neutralization agent; and

(iii) separating the alkoxysilane from treating agent, the unused neutralization agent and the by-products of neutralization.

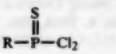
4,697,028

PROCESS FOR PRODUCING A DISULFIDE DIMER OF EPTD

Louis F. Bolzan, Briarcliff Manor, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Dec. 16, 1985, Ser. No. 809,631
Int. Cl.[4] C07F 9/38
U.S. Cl. 558—89 **8 Claims**

1. A process for producing a disulfide dimer of hydrocarbylthiophosphonic dichloride which comprises the reaction of hydrocarbylthiophosphonic dichloride of the formula



wherein R is a hydrocarbyl radical free of aliphatic unsaturation and hydrogen sulfide and wherein a solvent is used for preparing and recovering the product.

4,697,029

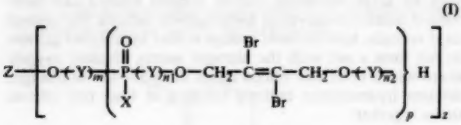
PHOSPHOBROMINATED POLYETHERPOLYOLS AND PROCESSES FOR PRODUCTION THEREOF

André Collin, Ligny, and Henri Wautier, Braine-le-Comte, both of Belgium, assignors to Solvay & Cie. (Société Anonyme), Brussels, Belgium

Filed Jan. 17, 1986, Ser. No. 821,021
Claims priority, application France, Jan. 24, 1985, 85 01109
Int. Cl.[4] C07F 9/09, 9/40
U.S. Cl. 558—92 **7 Claims**

1. A phosphobrominated polyetherpolyol which contains oxyalkylene radicals bound to phosphorus atoms in the phosphate or phosphonate state and 1,4-dioxy-2,3-dibromo-2-butylene radicals in which the ratio of the total number of oxyalkylene radicals to the total number of phosphorus atoms is at least 7, and corresponding to the general formula:

(I)

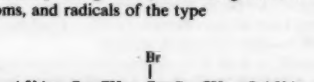


in which

Z denotes a non-hydroxylated aliphatic radical containing from 1 to 6 carbon atoms and of valence z

Y denotes oxyalkylene radicals derived from ethylene oxide, propylene oxide and/or butylene oxide, the radicals Y derived from ethylene oxide representing at most 50 moles % of all the Y radicals

X denotes monovalent aliphatic radicals, which may be identical or different, chosen from radicals of the —R or —OR type in which R denotes a saturated alkyl radical, optionally halogenated, containing from 1 to 3 carbon atoms, and radicals of the type



z denotes an integer ranging from 1 to 4

m denotes a number such that $0 \leqq zm \leqq 50$ z

p denotes a number such that $z \leqq zp \leqq 5$ z and

n_1 and n_2 denote numbers other than zero, such that $2\ pz \leqq pz\ (n_1+n_2) \leqq 12\ pz$, these phosphobrominated polyetherpolyols being further characterized by a ratio of the total number of oxyalkylene radicals to the total number of phosphorus atoms equal to at least 7.

4. Process for producing phosphobrominated polyetherpolyols according to claim 1, comprising steps for, condensing in a first stage, z moles of phosphodichlorinated reagent (IV) in the presence of one mole of hydroxylated initiator (II) to produce a phosphochlorinated product (V) and, condensing in a second stage, pz moles of brominated polyoxyalkylenediol (III) and $(p-1)$ z moles of phosphodichlorinated reagent (IV) in the presence of the product (V) resulting from the preceding stage.

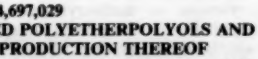
4,697,030

PHOSPHATE-CONTAINING AND PHOSPHONATE-CONTAINING PHOSPHATE ESTERS

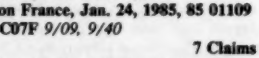
Thomas A. Hardy, Thousand Oaks, Calif., and Edward N. Walsh, New City, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed May 23, 1985, Ser. No. 737,374
Int. Cl.[4] C07F 9/11, 9/40
U.S. Cl. 558—163 **18 Claims**

1. A compound of the formula:



wherein R is:



R_8 is the same or different and is alkyl, haloalkyl, aryl or haloaryl;

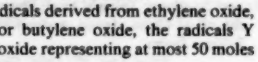
R_2 and R_4 are the same or different and are alkylene or haloalkylene;

Y is an integer from 1–10; and

Z is an integer from 1–10.

8. A compound of the formula:

wherein R is:



R_1 and R_5 are the same or different and are alkyl, haloalkyl, aryl or haloaryl;

R_6 and R_7 are the same or different and are hydrogen, alkyl, haloalkyl, aryl or haloaryl;

R_2 is alkylene or haloalkylene, alkylene or haloalkylene;

n is an integer from 1–2;

a is 0 or 1; and

y is an integer from 1–10.

4,697,031

ANTIHYPERTENSIVE PHOSPHATE DERIVATIVES

Allan Wissner, Ardsley, and Phaik-Eng Sun, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 10, 1984, Ser. No. 679,792
Int. Cl.[4] C07F 9/10
U.S. Cl. 558—169 **6 Claims**

1. 7-[[4-(phenylmethoxy)phenoxy]methyl]-4-hydroxy-

N,N,N-trimethyl-9-oxo-3,5,8-trioxa-4-phosphadecan-1-aminium, 4-oxide, hydroxide, inner salt.

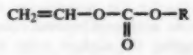
6. 8-[[[5-(dodecyloxy)-1-naphthalenyl]oxy]methyl]-5-hydroxy-N,N,N-trimethyl-10-oxo-4,6,9-trioxa-5-phosphadecan-2-aminium, 5-oxide, hydroxide, inner salt.

4,697,032
PROCESS FOR THE PREPARATION OF 1-BROMOETHYL HYDROCARBONYL CARBONATES AND NEW 1-BROMOETHYL HYDROCARBONYL CARBONATES

Thierry Malfroot, Saintry sur Seine; Marc Piteau, Itteville, and Jean-Pierre Senet, La Chapelle la Reine, all of France, assignors to Societe Nationale des Poudres et Explosifs, Paris, France

Filed Nov. 8, 1985, Ser. No. 796,555
Claims priority, application France, Nov. 23, 1984, 84 17847
Int. Cl.[4] C07C *68/06*
U.S. Cl. 558—270 **6 Claims**

1. A process for the preparation of a 1-bromoethyl hydrocarbonyl carbonate, which consists of reacting anhydrous hydrobromic acid with a vinyl hydrocarbonyl carbonate of formula



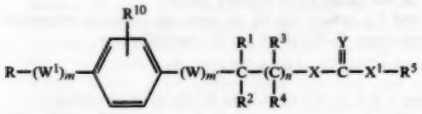
wherein R is a saturated, C_1–C_8 aliphatic radical or alicyclic radical or an aromatic radical, wherein said aliphatic, alicyclic or aromatic radical is unsubstituted or substituted by halogen atoms or saturated hydrocarbon radicals, at a temperature between 10° C. and 100° C. and isolating said 1-bromoethyl hydrocarbonyl carbonate from the reaction mixture.

4,697,033
CARBAMIC AND CARBAMOTHIOIC ACID ESTERS AS PESTICIDES

Clive A. Henrick, Palo Alto, Calif., assignor to Sandoz Ltd., Basel, Switzerland

Filed Dec. 24, 1985, Ser. No. 813,182
Int. Cl.[4] C07C *149/40, 125/06, 155/02, 119/20*
U.S. Cl. 558—233 **26 Claims**

1. A compound of the following formula (A):



(A)

wherein,

each of m and m' is independently zero or one;

n is zero, one, two or three;

n' is zero, one or two;

n'' is zero, one, two or three;

W is oxygen, sulfur, NR^6, CR^3R^4 or carbonyl;

W^1 is oxygen, sulfur, NR^6, CR^3R^4, carbonyl, sulfinyl or sulfonyl;

each of X and X^1 is oxygen, sulfur or NR^7; provided that one of X or X^1 must be NR^7, while the other of X or X^1 is oxygen or sulfur;

X^2 is oxygen or sulfur;

Y is oxygen, or sulfur;

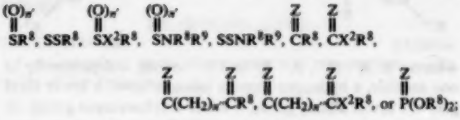
Z is oxygen or sulfur;

R is hydrogen, lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, lower alkoxyalkyl, lower alkylthioalkyl, cycloalkyl, halocycloalkyl, or cycloalkylalkyl,

each of R^1, R^2, R^3, R^4, and R^6 is independently hydrogen or lower alkyl;

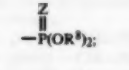
R^5 is lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, cycloalkyl, cyaloalkylalkyl, phenyl or substituted phenyl;

R^7 is selected from the groups:



R^8 is hydrogen, lower alkyl, lower haloalkyl, lower cycnoalkyl, or substituted or unsubstituted aryl;

R^9 is lower alkyl, aryl, alkoxycarbonyl, substituted or unsubstituted aryloxycarbonyl, alkoxycarbonylalkyl, lower alkylsulfonyl, alkylaminosulfonyl, dialkylaminosulfonyl or the group



and

R^{10} is hydrogen, lower alkyl, lower haloalkyl or halogen.

4,697,034
PROCESS FOR MAKING DIARYL CARBONATES

Mojtaba Janatpour, Evansville, Ind., and Sheldon J. Shafer, Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 551,718, Nov. 15, 1985, abandoned. This application Dec. 31, 1985, Ser. No. 815,205
Int. Cl.[4] C07C *68/02*
U.S. Cl. 558—274 **11 Claims**

1. A process for the synthesis of a diaryl carbonate which comprises:

(a) contacting a phenolic compound in a first reaction zone with an equimolar amount or less of an alkali metal hydroxide to form an alkali metal phenoxide compound,

(b) reacting said alkali metal phenoxide compound with phosgene at a temperature above the melting point of the diaryl carbonate being synthesized in a second reaction zone comprising a reactor-mixer providing a highly intimate admixture of the initial reaction system to form the diaryl carbonate, and

(c) recovering substantially pure diaryl carbonate from the reaction mixture;

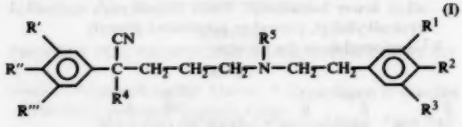
wherein said steps (a) and (b) are carried out completely isolated from each other.

4,697,035
PROCESS FOR THE PREPARATION OF BASICALLY SUBSTITUTED PHENYLACETONITRILES

Lothar Kisielowski; Ingomar Grafe; Walter Liebenow, and Kurt H. Ahrens, all of Nuremberg, Fed. Rep. of Germany, assignors to Ludwig Heumann & Co., GmbH, Fed. Rep. of Germany

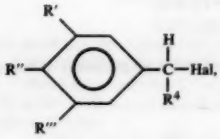
Filed Jun. 3, 1985, Ser. No. 740,250
Claims priority, application European Pat. Off., Jun. 15, 1984, 84106868.7
Int. Cl.[4] C07C *121/78*
U.S. Cl. 558—344 **11 Claims**

1. Process for the preparation of basically substituted phenyl acetonitriles corresponding to the general formula I



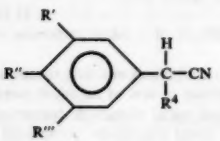
(I)

wherein R',R'', R''', R^1, R^2 and R^3 denote, independently of one another, a hydrogen atom, a halogen atom. a lower alkyl group, a lower alkoxy group, a lower alkylmercapto group, an amino group or an amino group which is mono- or disubstituted by a lower alkyl group, R^4 denotes a straight chained or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms or a saturated or unsaturated cyclic hydrocarbon group having 5 or 6 carbon atoms, and R^5 denotes a hydrogen atom or a lower alkyl group, characterised in that a compound corresponding to the general formula II



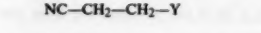
(II)

wherein R',R'',R''' and R^4 have the meanings indicated above and Hal stands for a halogen atom, is reacted with a cyanide of the formula Me—CN, wherein Me denotes a monovalent metal, to form the nitrile of formula III



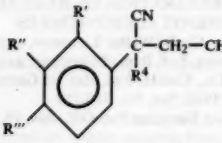
(III)

wherein R',R'',R''' and R^4 have the meanings indicated above, the resulting compound III is reacted with a β-substituted propionitrile corresponding to the general formula IV



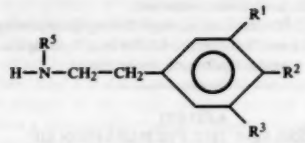
(IV)

wherein Y denotes a lower alkoxy group or the group NH-Z, wherein Z represents a lower alkyl group, a C_5-C_6-cycloalkyl group or an optionally substituted phenyl group, and the resulting compound V



(V)

wherein R', R'', R ''' and R^4 have the meanings indicated above, is reduced in the presence of a phenylethylamine corresponding to formula VI



(VI)

wherein R^1, R^2, R^3 and R^5 have the meanings indicated above, or in the presence of a salt thereof.

4,697,036

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE ALPHA-ARYLALKANOIC ACIDS AND NOVEL INTERMEDIATES THEREOF

Claudio Giordano, Vicenza; Graziano Castaldi, Briona; Fulvio Uggeri, Codogno, and Silvia Cavicchioli, Costermano, all of Italy, assignors to Zambon S.p.A., Vincenza, Italy

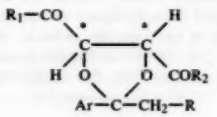
Filed Apr. 5, 1985, Ser. No. 720,380

Claims priority, application Italy, Apr. 6, 1984, 7204 A/84; Aug. 6, 1984, 7206 A/84; Aug. 6, 1984, 7207 A/84

Int. Cl.[4] C07C *51/16*

U.S. Cl. 562—418 **8 Claims**

1. An enantioselective process for the preparation of an optically active alpha-arylalkanoic acid, said process comprising stereo specifically halogenating the carbon atom in the alpha-position to the ketal group in a homochiral ketal of the formula



in which

Ar represents aryl, aryl substituted by halogen, C_1–C_4 alkyl, C_3–C_6 cycloalkyl, benzyl, hydroxy, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 haloalkyl, C_1–C_4 haloalkoxy, phenoxy, thienylcarbonyl or benzoyl;

R represents linear or branched C_1–C_4 alkyl;

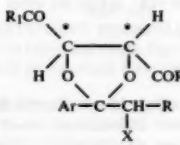
R_1 and R_2, which can be the same or different, represent hydroxy, O^-M^+, OR_3 or NR_4R_5, wherein R_3 is C_1–C_{24} alkyl, C_3–C_6 cycloalkyl, phenyl or benzyl;

M^+ is the cation of an alkaline metal;

R_4 and R_5, which can be the same or different, represent hydrogen, C_1–C_4 alkyl, C_5–C_6 cycloalkyl, or

$$-(CH_2)_n-CH_2OH$$

where n is 1, 2 or 3 or R_4 and R_5 together constitute $-(CH_2)_m-$ wherein m is 4 or 5 or $-CH_2-CH_2-R_7-CH_2-CH_2-$ wherein R_7 is an oxygen atom, NH or N-(C_1–C_4) alkyl; and the C atoms indicated by an asterisk both have (R) or (S) configuration, said ketal being halogenated in the alpha-position to the ketal group with an achiral halogenating reagent giving an epimeric mixture of alpha-halogenketals enriched in the RRS epimer when starting from the RR un-halogenated ketal, and enriched in the SSR epimer when starting from the SS un-halogenated ketal, said alpha-halogenketal having the formula

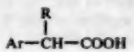


(A)

wherein:

Ar, R, R_1 and R_2 are as above-defined and X is Cl, Br or I, and

rearranging said mixture to an enantiomeric mixture of alpha-arylalkanoic acids of the formula



where Ar and R are as above-defined, having an enantiomeric ratio at least equal to or higher than the epimeric ratio of the starting alpha-haloketals, in a water-containing medium under acidic conditions.

4,697,037

PREPARATION OF DIBENZO[B,F]THIEPIN COMPOUNDS

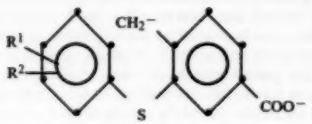
Thomas R. Verhoeven, Cranford, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 610,064, May 14, 1984, abandoned. This application Oct. 11, 1985, Ser. No. 786,768

Int. Cl.[4] C07C *149/40, 149/42, 51/15, 147/13;* 5

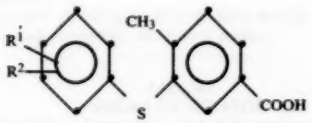
U.S. Cl. 562—432 **17 Claims**

1. A process for preparing a dianion of the formula II:



II

which comprises reacting, in a solvent, sodium hydride with a compound of Formula III:

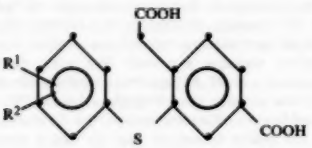


III

wherein

R^1 and R^2 are independently selected from hydrogen, halogen, alkyl or 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio wherein the alkyl moiety has 1 to 4 carbon atoms, alkylsulfinyl wherein the alkyl moiety has 1 to 4 carbon atoms, alkyl sulfonyl wherein the alkyl moiety has 1 to 4 carbon atoms, trifluoromethyl, trifluoromethylthio, cyano, nitro, dialkylamino wherein each alkyl moiety has 1 to 4 carbon atoms, carboxy, and phenylalkyl wherein the alkyl moiety has 1 to 4 carbon atoms, substituted phenylalkyl wherein the alkyl moiety has 1 to 4 carbon atoms and the phenyl group is substituted with halogen, nitro, or alkyl having 1 to 4 carbon atoms, followed by deprotonation with an alkali metal dialkylamide base, an alkylamide base, or an alkali metal amide base.

12. A process of claim 1 further comprising treating said dianion with carbon dioxide to produce a compound of formula I:



I

4,697,038

METAL EXTRACTION USING A NOVEL GROUP OF COMPOUNDS AND CHEMICAL PURIFICATION METHOD

John H. P. Tyman, London, England, assignor to 501 Brunel University, Middlesex, England

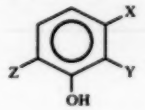
Filed Mar. 7, 1984, Ser. No. 587,068

Claims priority, application United Kingdom, Oct. 24, 1983, 8328403

Int. Cl.[4] C07C *131/00*

U.S. Cl. 564—265 **8 Claims**

1. A compound useful for extraction of copper from acidic media of the formula



in which:

X represents a straight chain hydrocarbyl group containing from 8 to 17 carbon atoms,

Y represents H or the group —CH=NOH, and

Z represents H or the group —CH=NOH,

provided that Y and Z are different; or such compound containing at least one electronegative substituent on the aromatic ring selected from the group consisting of chloro, nitro and cyano.

4,697,039

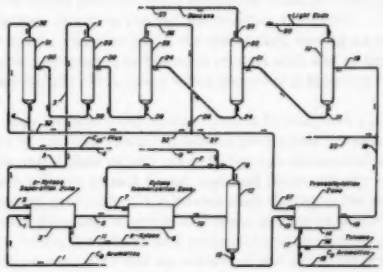
XYLENE PRODUCING PROCESS HAVING STAGED CATALYTIC CONVERSION OF ETHYLBENZENE

Robert J. Schmidt, Rolling Meadows, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 775,982, Sep. 13, 1985, Pat. No. 4,642,406. This application Feb. 9, 1987, Ser. No. 12,401

Int. Cl.[4] C07C *5/22*

U.S. Cl. 585—477 **19 Claims**



1. In a process for the production of paraxylene wherein a feed stream comprising a mixture of C_8 aromatic hydrocarbons is passed into a processing complex, paraxylene is recovered from a C_8 aromatic hydrocarbon-rich stream in a xylene separation zone, a raffinate stream from the separation zone is processed in a catalytic isomerization zone to produce an isomerization zone effluent stream containing additional amounts of paraxylene, C_7 aromatic hydrocarbons are processed in a catalytic transalkylation reaction zone in contact

with a catalyst to produce benzene and additional xylenes, and the effluent of the transalkylation zone is separated by fractional distillation to recycle toluene and to recover mixed xylenes which are passed into the xylene separation zone; the improvement which comprises staged conversion of ethylbenzene present in the raffinate stream by conversion into paraxylene in the isomerization zone followed by dealkylation of ethylbenzene in the transalkylation zone by a series of steps which comprises passing the raffinate stream into the catalytic isomerization zone, and then passing a process stream containing substantially all of the ethylbenzene and xylenes present in the isomerization zone effluent stream directly into the transalkylation zone, which is operated at high severity conditions including a temperature over 426 degrees Celsius.

4,697,040

ISOMERIZATION OF VINYLIDENE OLEFINS

Roger C. Williamson, Kingwood, Tex., and James J. Harrison, Novato, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 833,296, Feb. 25, 1986, abandoned. This application Jan. 8, 1987, Ser. No. 1,930

Int. Cl.[4] C07C *5/25, 5/27*

U.S. Cl. 585—666 **4 Claims**

1. A process for isomerization of vinylidene olefins at least in part to tri-substituted ethylene compounds, which comprises contacting an olefinic feedstock, containing mostly vinyl olefins and minor amounts of vinylidene olefins, with a catalyst comprising LZ-Y52 zeolite under olefin isomerization reaction conditions.

4,697,041

INTEGRATED SOLAR CELLS

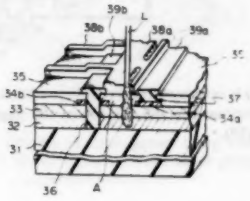
Hiroshi Okaniwa, Hachioji; Kenji Nakatani, and Tetsuo Sato, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Feb. 10, 1986, Ser. No. 828,197

Claims priority, application Japan, Feb. 15, 1985, 60-26426; Mar. 19, 1985, 60-53255; Apr. 19, 1985, 60-82172; May 15, 1985, 60-101540

Int. Cl.[4] H01L *27/14, 31/18*

U.S. Cl. 136—244 29 Claims



1. Integrated solar cells comprising a laminate of a bottom electrode layer, a photosensitive semiconductor layer, and a top electrode layer on a substrate and comprising a plurality of series-connected unit cells, at least said bottom and top electrode layers being divided to form said unit cells, the series-connection being made by electrically connecting a bottom electrode layer of a unit cell of neighboring unit cells with a top electrode layer of another unit cell of said neighboring unit cells, in which at least one of the top electrode layer and the semiconductor layer of the laminate has a laser-scribed groove in a designated pattern and an insulating strip is disposed at at least one of:

(a) between the top electrode layer and the semiconductor layer and

(b) between the bottom electrode layer and the semiconductor layer along said designated pattern.

4,697,042

SOLAR GENERATOR

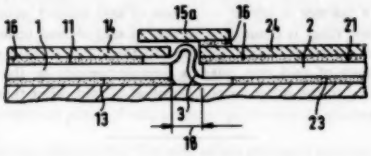
Roland Schilling, Gemmingen, Fed. Rep. of Germany, assignor to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Jul. 25, 1986, Ser. No. 889,343

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3527001

Int. Cl.[4] H02N *6/00*; H01L *25/02*

U.S. Cl. 136—244 7 Claims



1. A solar generator for use in space comprising separate and spaced semiconductor solar cells (1, 2) having surfaces (11, 21) provided for light incidence and electrically interconnected, elastically deformable connection contacts (3) for the light incidence surfaces and for the opposite rear faces (13 and 23), with each solar cell having a separate surface covering, wherein the surface coverings (14, 24) are so designed that the spaces (18) between adjacent solar cells, in which the connection contacts (3) are located, are each covered by a bridge (15) connected solely to, and supported solely by, a respective surface covering.

4,697,043

PERCHLOROETHYLENE DIELECTRIC FLUID CONTAINING ALIPHATIC HYDROCARBONS

Edward A. Rowe, Jr., North Perry, Ohio, assignor to Occidental Electrochemical Corporation, Niagara Falls, N.Y.

Filed Oct. 1, 1986, Ser. No. 914,060

Int. Cl.[4] H01B *3/24*

U.S. Cl. 174—17 LF 13 Claims

9. In an electrical device containing a dielectric fluid, the improvement which comprises employing as the dielectric fluid a nonflammable composition containing perchloroethylene and a minor amount of C_{7-9} aliphatic hydrocarbon.

4,697,044

CASING FOR ELECTRONIC DEVICES

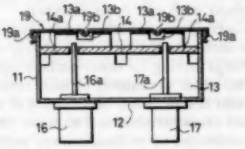
Keisuke Ishikawa, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 686,224, Dec. 26, 1984, abandoned. This application Aug. 25, 1986, Ser. No. 900,232

Claims priority, application Japan, Dec. 26, 1983, 58-200685[U]

Int. Cl.[4] H05K *9/00*

U.S. Cl. 174—35 R 2 Claims



1. In a casing for electronic devices of the type having a frame formed by a metal plate which is open at an upper end, a cover formed by a metal plate attached by its ends to the frame for covering the open upper end of the frame, and at least one shield plate disposed within the frame extending in a longitudinal direction thereof for dividing the interior of the frame into at least two parts, the shield plate having an upper tip portion adapted to be placed in contact with and to support an inner surface of the cover when the cover is mounted to the frame,

the improvement wherein said cover is formed with a plurality of parallel, elongated bossed projections pressed into the metal plate of said cover facing in a downward direction relative to said frame, and said cover thereby being further provided with a bowed shape facing in the downward direction, whereby said inner surface of said cover, excluding the area of said projections, is pressed securely into contact with said tip portion of said shield plate when said cover is mounted to said frame,

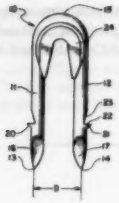
wherein said plurality of parallel projections are pressed in said cover extending in a direction transverse to the longitudinal direction of said shield plate, and said tip portion of said shield plate is divided into a corresponding plurality of sections each having a recess therein to accomodate a respective one of said projections, said casing containing a circuit board for mounting electronic devices thereon, and said plurality of tip sections of said shield plate extending upward through corresponding holes formed in said circuit board to contact said inner surface of said cover.

4,697,045

ELECTRICALLY INSULATIVE STAPLE

Marguerite R. Beatty, 5582 Club View Dr., Yorba Linda, Calif. 92686

Filed Apr. 3, 1986, Ser. No. 846,731
Int. Cl.[4] H01B *17/00*; F16B *15/06*; E01B *9/06*; E06C *9/04*
U.S. Cl. 174—159 **2 Claims**



1. In an electrically insulative staple intended to be impacted into a wood support structure and having a pair of parallel spaced apart prongs joined together at common ends by a semi-circular cross member and pointed at their opposite ends, the improvement which comprises:

a single barb carried on each one of said pair of prongs outwardly projecting from the external side thereof laterally extending beyond the outer dimension of said respective prongs;

said barb carried on each one of said prongs having a rounded portion outwardly disposed beyond the outer dimension of said respective prongs facing said pointed end of each one of said respective prongs opposite to their ends joined with said cross member;

said barb carried on each of said prongs further having a flat surface normal to the longitudinal axis of said each one of said prongs having an outer surface portion exposed beyond the outer dimension of said respective prong and facing said common end of each one of said prongs joined with said cross member and an inner surface portion disposed within the outer dimension of said respective prong;

an internal pocket provided in each one of said prongs immediately adjacent to said barb inner flat surface portion to be occupied by material of a wood support structure to prevent withdrawal of said staple after installation;

an insulative sleeve disposed on the inside surface of said semi-circular cross member and extending partly along the opposing inner length of each of said prongs, said insulative sleeve having a U-shape in front elevational view with an arcuate groove provided in its outer surface occupied by said cross member; and

said pointed ends of said prongs having terminating points which include angled flat surfaces lying on different planes facing the terminating points of said pointed ends for cooperating to spread said prongs during impacting installation procedure.

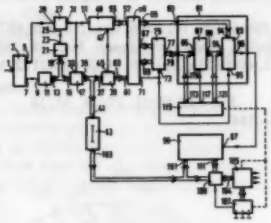
4,697,046

TELETEXT SIGNAL PROCESSING CIRCUIT FOR A TELETEXT RECEIVER

Michaël P. W. Geerings; Wilhelmus J. Christis; Wilhelmus F. Fekkes, and Herman J. R. Schmitz, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 10, 1986, Ser. No. 918,176
Claims priority, application Netherlands, Oct. 10, 1985, 8502766
Int. Cl.[4] H04L *13/08, 15/24*
U.S. Cl. 178—1 **4 Claims**

1. A teletext signal processing circuit for a teletext receiver comprising a page-address selection circuit for the selection of a received page address from a received teletext signal; and a multi-page memory which can be written into with received teletext information of pages determined by a page-number memory, wherein for obtaining a write command (output **96**) for the multi-page memory (**99**, input **97**) the page-number



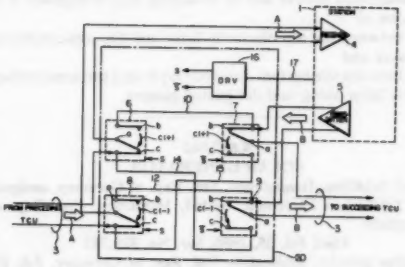
memory (**81**) is read by a received page address obtained from an output combination (**65**, **67**, **69**) of the page-address selection circuit (**59**).

4,697,047

TRUNK COUPLING UNIT

Masato Hirai; Masami Kurata, and Ryozo Yoshino, all of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Computer Engineering Co., Ltd., Kanagawa, both of, Japan

Filed Aug. 1, 1986, Ser. No. 891,886
Claims priority, application Japan, Aug. 21, 1985, 60-181807
Int. Cl.[4] H04B *3/42*
U.S. Cl. 178—2 C **3 Claims**



3. A relay circuit including a plurality of relays for connecting a first terminal and either one of second terminals, wherein one of said relays is connected to the other of said relays in such a manner in which when one of said second terminal of said one relay is connected to one of said second terminal of said other relay, signal supplied to the other of said second terminals of said one relay is complementary to the signal supplied to the other second terminal of said other relay.

4,697,048

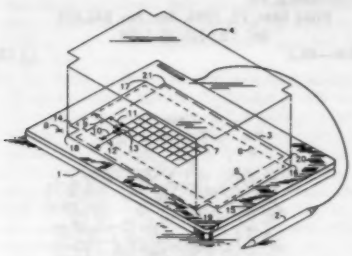
GRAPHICS TABLET MENU LOCATOR ACCOMMODATING DIFFERING SIZES OF PAPER

Brad Clements, Ft. Collins, and John C. Keith, Loveland, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 29, 1986, Ser. No. 857,006
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 **2 Claims**

1. Apparatus comprising a digitizing surface upon which coordinates are digitized, the digitizing surface having within

its extent a recess bounded by a plurality of groups of four corners, the corners in each group describing an associated



rectangle, and the corners of each group lying outside the rectangles described by the corners of the other groups.

4,697,049

DEVICE FOR PRODUCING X-Y COORDINATE ADDRESSES FOR A PICTURE SCREEN

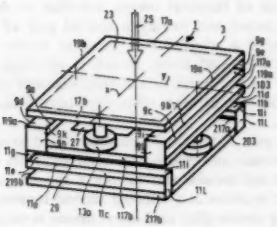
Horst Peemöller, and Heino Svensson, both of Hamburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 16, 1986, Ser. No. 886,572

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525499

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **5 Claims**



1. A device for producing x-y coordinate addresses for a picture screen, comprising

a plurality of force measuring sensors,

an operating plate having a force-sensitive transparent surface which influences said force measuring sensors, so that when a force is exerted at a pressure point on said surface of said operating plate, said force measuring sensors produce pressure point electrical signals, and

an electronic system for converting said signals into digital x-y coordinate addresses which accurately correspond to a geographical place of said pressure point on said picture screen,

said operating plate having first side edges arranged approximately parallel and opposite to each other and second side edges shifted by about 90° with respect to the first side edges and also arranged approximately parallel and opposite to each other, said operating plate being arranged on resilient supports; and characterized by comprising

(a) a plurality of auxiliary plates arranged behind said operating plate in planes parallel to it, said operating plate and said auxiliary plates forming respective pairs of plates;

(b) a pair of resilient edge supports disposed between each pair of said plates, each of said pair of resilient edge supports being arranged between said respective pairs of said plates longitudinally in the same direction between said side edges extending parallel to and over each other, and further being shifted for said respective pairs of said plates alternately about 90° from said first to said second side edges and conversely; and

(c) further characterized in that said force measuring sensors are arranged halfway between each pair of said resilient edge supports, each of said force measuring sensors being adjacent said side edges of said plates.

4,697,050

DEVICE FOR DIGITALIZING GRAPHICAL DATA

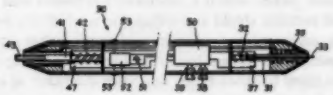
Alain Farel, 2, allée des Coquelicots, 78630 Orgeval; Manuel Agobian, Pontcarre, and Sinh Le, Maisons Alfort, all of France, assignors to Alain Farel, Oregval, France

Filed Jul. 8, 1986, Ser. No. 883,312

Claims priority, application France, Jul. 9, 1985, 85 10508

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **6 Claims**



1. Device for digitalizing graphical data at the time of their creation, comprising:

a drawing table incorporating a grid formed by a first assembly of conductors arranged in lines, and a second assembly of conductors arranged in columns;

write or erase means, comprising: write or erase members for selectively performing visible plottings or effective erasings on the drawing table; means for generating magnetic fields having different predetermined characteristics, each magnetic field corresponding to a respective one of the write or erase functions which can be performed, the generated magnetic field being determined according to the selected write or erase function, and electric supply means to enable the self-operation of the write or erase means, and

a detection and computing circuit, connected to the conductors of the grid to receive the signals induced in said conductors by the generated magnetic field and comprising processing means for working out a position data representing the position of the write or erase member used, with respect to the drawing table, and to differentiate, from the signals received on the conductors of the grid, the various magnetic fields, one from the other, so as to combine the data representing the selected write or erase functions which has been selected with the position data.

4,697,051

DATA TRANSMISSION SYSTEM

Richard D. Beggs, Duluth; Harold W. Friesen, and Wendell G. Nutt, both of Dunwoody, all of Ga., assignors to AT&T Technologies Inc., AT&T Bell Laboratories, Berkeley Heights, N.J.

Filed Jul. 31, 1985, Ser. No. 760,867

Int. Cl.[4] H01B *11/04, 11/10*

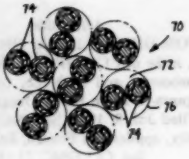
U.S. Cl. 178—63 D **22 Claims**

13. A cable which is capable of relatively high rate, substantially error-free data transmission, said cable comprising:

a core which includes a plurality of twisted pairs of individually insulated conductors wherein the manner in which the pairs are disposed in the core which inhibits substantially pair meshing and the twist lengths, which are relatively short, cause the pairs to be decoupled sufficiently from one another to allow substantially error-free data transmission over relatively long distances, the pairs being

assembled together such that each pair is disposed in a circle having a diameter equal to twice the outer diameter of an insulated conductor and such that the circle which circumscribes the cross-sectional areas of the insulated conductors of each pair is substantially uninterrupted by the circumscribed circle of any adjacent pair;

a metallic shield which encloses said core;



an inner jacket which is interposed between said core and said metallic shield and which has a relatively low dielectric constant, and wherein said inner jacket comprises a plastic material and has a thickness in the range of about one-third to three times the outer diameter of each insulated conductor; and

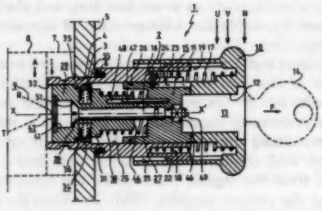
an outer jacket which comprises a plastic material and which encloses said metallic shield.

4,697,052

EMERGENCY SWITCHING APPARATUS

Xavier Ruaud, Soyaux, France, assignor to La Telemecanique Electrique, France

Filed Dec. 23, 1985, Ser. No. 812,685
Claims priority, application France, Dec. 28, 1984, 84 19988
Int. Cl.[4] H01H *27/08*
U.S. Cl. 200—43.07 **5 Claims**



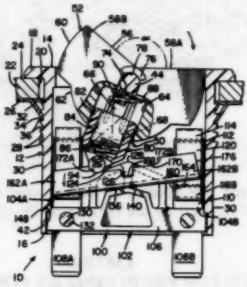
1. A switching apparatus comprising an electric switch having an actuating member and an emergency push-button returned to a neutral position by a return spring and concentrically sliding on a tubular body fitted with an internal sliding piston which is retained by resilient latching means in an inactive position before the push button has linearly travelled over a given distance when the push button is pressed in and which is held in an active position by this same latching means when the push-button has linearly travelled over said given distance said sliding piston being abruptly propelled into engagement with the actuating member by means of a loading spring placed between the sliding piston and the push-button, said piston being mounted inside a bore at one end of the tubular body for moving from said inactive to said active positions, said piston being placed about a connecting coaxial bolt having a first end which is integral with the emergency push-button and a head which is located in close proximity to said actuating member so as to push said actuating member when the push-button has traveled over said given distance and yet the piston has not been able to move towards its active position.

4,697,053

ROCKER SWITCH

Joseph L. Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 21, 1986, Ser. No. 842,604
Int. Cl.[4] H01H *5/08*
U.S. Cl. 200—68.2 **23 Claims**



1. An electrical switch of the type having an actuator movable between a first position and a second position for moving a bridge member to electrically bridge a first pair of terminals or a second pair of terminals respectively, said terminals engageable with respective corresponding contact means, said switch comprising:

housing means having an actuating face and a contact face;

dielectric insert means mountable within said housing means proximate said contact face thereof;

a first pair of terminal means mounted to said dielectric insert means and having a spaced pair of first contact sections at a selected first location within said housing means after said insert means is mounted therein and further having outer first contact sections at said contact face for engagement with first corresponding contact means;

a second pair of terminal means mounted to said dielectric insert means and electrically insulated from said first pair of terminal means, and having a spaced pair of second contact sections at a selected second location within said housing means after said insert means is mounted therein, and further having outer second contact sections at said contact face for engagement with second corresponding contact means;

a bar having a first conductive end associated with said pair of first contact sections and a second conductive end associated with said pair of second contact sections;

mounting means for securing said bar to said dielectric insert means prior to mounting said dielectric insert means within said housing means such that said first end is proximate said pair of first contact sections and said second end is proximate said pair of second contact sections, said mounting means including a pivot means and permitting actuated movement of said bar about said pivot means between a first position and a second position;

actuating means secured to said housing means proximate said actuating face and movable between a first actuating position and a second actuating position, said actuating means including bearing means engageable with said bar at only a first engaging position proximate said first end thereof and a second engaging position proximate said second end thereof, said actuating means further including means for axially loading said bearing means;

biasing means for camming said bearing means away from loaded engagement with said bar at an initial one of said first and said second engaging positions, and permitting impacting of said bearing means into loaded engagement with said bar at a resulting one of said first and said second

engaging positions, during movement of said actuating means between said first and said second positions; and

holding means for holding said bar stationary at an initial one of said first and said second bridging positions such that a respective one of said first and said second ends thereof is held under substantial contact normal force in electrical engagement with a respective pair of said first and second contact sections;

said bar being movable by said actuating means to a first bridging position electrically bridging only said pair of first contact sections when said actuating means is in said first actuating position and to a second bridging position electrically bridging only said pair of second contact sections when said actuating means is in said second actuating position, and said bar being held in said initial one of said first and second bridging positions until being moved to a resulting one of said first and second bridging positions by being impacted by said bearing means proximate said resulting one of said first and said second engaging positions.

4,697,054

DIFFERENTIAL PRESSURE OPERATED ELECTRICAL SWITCH CONSTRUCTION AND METHOD OF MAKING THE SAME

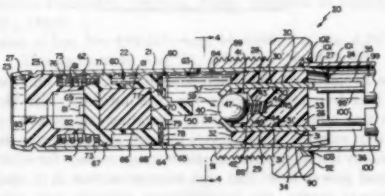
Rolf H. Ochsner, Trumbull, and Charles J. Everett, Clinton, both of Conn., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 723,065, Apr. 15, 1985, Pat. No. 4,630,360. This application Aug. 28, 1986, Ser. No. 900,995

The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.

Int. Cl.⁴ H01H *35/38*

U.S. Cl. 200—82 R **3 Claims**



1. In a differential pressure operated electrical switch construction having a housing means carrying a pair of rigid terminals that have body portions thereof disposed substantially parallel to each other and an electrical switch means for electrically interconnecting said terminals together when said switch means is in one operating condition thereof and for electrically disconnecting said terminals for each other when said switch means is in another operating condition thereof, said housing means having actuator means responsive to differential pressures acting across the same and being operatively associated with said switch means to cause said switch means to be in said one condition thereof when having a certain differential pressure acting across the same and to cause said switch means to be in said other condition thereof when having another certain differential pressure acting across the same, the improvement wherein said terminals have free ends bent toward each other at an angle other than a right angle relative to said body portion of its respective terminals, said switch means comprising a movable contact member and a biasing means operatively associated with said contact member for urging and wedging said contact member into bridging contact with said free ends of said terminals and thereby cause said switch means to be in said one condition thereof and for being out of engagement with said free ends of said terminals and threreby cause said switch means to be in said other condition thereof, said contact member comprising a ball, said ball being confined in its movement by said free ends of said terminals, said actuator means comprising a movable piston disposed in said housing means and having opposed ends respectively adapted to be subjected to said differential pressure, one of said ends being movable between said free ends of said terminals and thereby be engageable with said ball to cause movement thereof, a stop being carried by said housing means and being adapted to be engaged by said ball when said ball is moved by said piston to cause said switch means to be in said other operating condition thereof, said housing means comprising a tubular member having opposed open ends and an electrically insulating plug member disposed in one of said ends of said tubular member to close the same, said plug member carrying said terminals and having an end surface means that defines said stop, said free ends of said terminals extending beyond said surface means, said biasing means comprising a coiled compression spring disposed between said surface means and said ball, said ball being disposed between said free ends of said terminals and said spring so as to be confined in its movement by said free ends of said terminals.

4,697,055

ARC EXTINCTION DEVICE FOR GAS INSULATION ELECTRICAL SWITCHGEAR

Jean-Jacques Walter, Boulogne; Daniel Petit, Paris; Joseph Marzocca, Grenoble; Jean Amalric, Meylan, and Georges Bernard, St. Egrève, all of France, assignors to Merlin Gerin, France

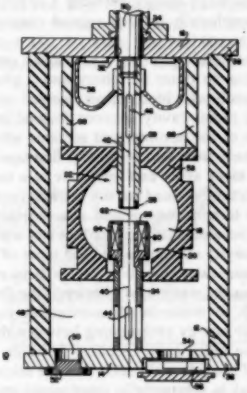
PCT No. PCT/FR85/00141, § 371 Date Feb. 4, 1986, § 102(e) Date Feb. 4, 1986, PCT Pub. No. WO86/00169, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 5, 1985, Ser. No. 841,866

Claims priority, application France, Jun. 8, 1984, 84 09056

Int. Cl.⁴ H01H *33/64*

U.S. Cl. 200—148 B **9 Claims**



1. Arc extinction device for self-expansion and gas insulation switch or circuit breaker, comprising:

a sealed housing filled with a high dielectric strength insulating gas, notably sulfur hexafluoride,

a divisional arc chute inside said housing,

a pair of separable contacts housed in said arc chute, at least one of the contacts being hollow,

a gas outflow duct from said arc chute to a discharge chamber in which expansion of the gas initially compressed in the arc chute takes place under the action of the arc drawn between the contacts separated when the circuit breaker opens,

and connection terminals in electrical connection with said contacts,

wherein the divisional arc chute comprises in a straight line with the contact separation area a wall forming a curved side revolution surface of a non linear curve, notably convex or concave, in such a way as to form an acoustic resonator reflecting the pressure waves inwardly, causing the gases to converge towards said separation area, and that the separable contacts are located in the vicinity of the middle area of said arc chute.

4,697,056

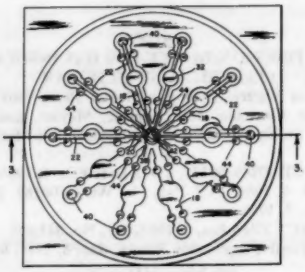
MULTIPOSITION MICROWAVE SWITCH WITH EXTENDED OPERATIONAL FREQUENCY RANGE

Jerzy Hoffman, Los Angeles, Calif., assignor to Dynatech/U-Z, Inc., Venice, Calif.

Continuation of Ser. No. 636,865, Aug. 2, 1984, abandoned. This application Nov. 15, 1985, Ser. No. 798,715

Int. Cl.[4] H01P *1/12*

U.S. Cl. 200—153 S **7 Claims**



1. A multiposition microwave switch for coupling and switching microwave energy between a central cavity and a plurality of peripherally located coaxial connectors comprising:

(a) a metallic housing having a base and a cover plate, said base having an outer periphery and a plurality of non-recessed sections which define recessed spaced inwardly extending radial cavity sections formed in said base by side walls of the non-recessed sections which side walls, progressively from said periphery, first taper, then expand and then taper again and terminate at a central recessed cavity portion defined at the periphery of the central cavity by terminations of said non-recessed sections and the space between said terminations and wherein the space between cavity sections at said last taper of said side walls forms a narrower transition region between the central cavity than the wider space between the first taper of the side walls to minimize discontinuities encountered by microwave energy propagating between the central cavity and the radial cavity sections between the first taper portion of the side walls such that the microwave energy propagated is substantially constrained to the generally desired TEM mode of propagation;

(b) a central coaxial connector of predetermined characteristic impedance mounted in said base with an inner conductor extending into and coaxially with said central recessed cavity portion;

(c) a plurality of peripheral coaxial connectors each said peripheral connector having a characteristic impedance equal to that of said central connector and being mounted in said base with an inner conductor extending into a peripheral end of one of said radial cavity sections;

(d) a plurality of radial conductors equal in number to said plurality of peripheral connectors, each switchably disposed in one of said radial cavity sections and of a length sufficient to connect said inner conductor of said central connector to said inner conductor of said peripheral connector when in a first of two switchable positions, and biased to be grounded when in a second of said switchable positions; and

(e) actuating means for selectively switching said radial conductors between said two switchable positions.

4,697,057

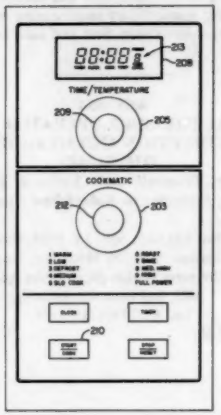
ELECTRICALLY OPERATED CONTROL DEVICE AND SYSTEM FOR A MICROWAVE OVEN AND METHOD OF MAKING THE SAME

Daniel L. Fowler, Kentwood, Mich., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jun. 17, 1985, Ser. No. 745,669

Int. Cl.[4] H05B *6/68*; G09G *3/02*

U.S. Cl. 219—10.55 B **5 Claims**



1. In an electrically operated control device for a microwave oven that has power means for cooking food, said device comprising a microprocessor for operating said power means at various selected power levels thereof, and a selector means electrically interconnected to said microprocessor for selecting a desired power level that said microprocessor is to operate said power means, the improvement wherein said selector means comprises a rotary switch means that is electrically interconnected to said microprocessor in such a manner that said selector means always selects the same set sequence of said power levels as said selector means is rotated in one direction from a beginning position thereof that selects a first power level of said sequence to an ending position thereof that selects a last power level of said sequence, said beginning position always being the position where said selector means was last set for a previously desired power level setting of said microprocessor even though said previously desired power level setting was a power level of said sequence other than said first power level thereof.

4,697,058

MICROWELD APPARATUS WITH AN IMPROVED ELECTRODE TIP DESIGN AND TIP SUPPORT

Wolfgang F. Mueller, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1986, Ser. No. 856,514

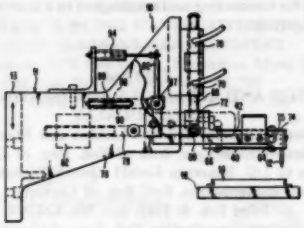
Int. Cl.[4] B23K *11/32*

U.S. Cl. 219—56.21 **19 Claims**

1. In a welding apparatus for bonding wire with a diameter less than 3 mil to a conductive metal surface wherein an electric current is passed through a portion of the wire in contact with a welding tip, the improvement comprising

a welding tip support means for supporting said welding tip for rectilinear vertical movement, the portion of said tip

support means that moves with and physically supports the welding tip having a movable mass less than 10 grams which is thereby capable of rapid movement necessary to maintain electrical contact between said welding tip and said wire portion during the molten phase of the wire during the welding operation,



said welding tip support means including at least two parallel leaf springs, each with one end fixed to said apparatus, and the other end fixed to said welding tip, and

a means to urge said welding tip support means into engagement with said wire on said metal surface.

4,697,059

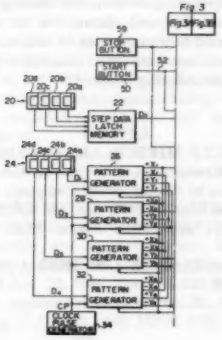
APPARATUS FOR PATTERN CONTROLLED ELECTRODE MOVEMENT FOR E.D.M.

Toshihiko Furukawa, Yamato, Japan, assignor to Sodick Co., Ltd., Japan

Division of Ser. No. 178,235, Aug. 14, 1980, Pat. No. 4,367,391. This application Aug. 31, 1982, Ser. No. 413,595

Int. Cl.⁴ B23H *7/06*

U.S. Cl. 219—69 W **3 Claims**



1. An electro-discharge machining apparatus for progressively conducting precise machining through relative straight and arcuate approach movements between an electro-discharge machining electrode and a workpiece in the horizontal direction substantially perpendicular to a direction in which said electrode is opposed to said workpiece, which apparatus is characterized by divider means dividing a movement region of said relative approach movement into a plurality of straight and arcuate sections with in the horizontal plane and designating trajectories of sid relative straight and arcuate approach movements for the respective straight and arcuate sections for successively and progressively achieving the machining.

4,697,060

ELECTRONIC BEAM WELDING METHOD FOR SCREEN CYLINDER

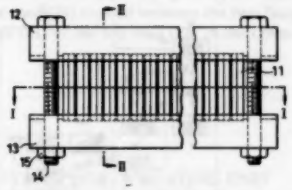
Akio Izuwa, and Tadanobu Yamaguchi, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jun. 26, 1986, Ser. No. 878,804

Claims priority, application Japan, Jun. 26, 1985, 60-139380

Int. Cl.⁴ B23K *15/00*

U.S. Cl. 219—121 ED **2 Claims**



1. An electronic beam welding method for a screen cylinder for welding junctions between both ends of rod-like pieces arranged at regular intervals and flanges with an electronic beam, characterized in that the welding is effected so that the irradiation direction of the beam is directed in the same direction as the surfaces of the welding junction and inclined at an acute angle with respect to a welding direction and the beam completely penetrates the flanges.

4,697,061

METHOD FOR WELDING BY MEANS OF LASER LIGHT

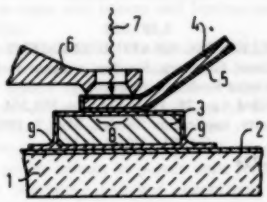
Lothar Spaeter, Annweiler, and Herbert Prussas, Reichertshausen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 29, 1986, Ser. No. 901,657

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1985, 3533468

Int. Cl.⁴ B23K *26/00*

U.S. Cl. 219—121 LD **5 Claims**



1. A method for laser light welding of a metallic base layer to a thin metallic covering lying thereon, whereby said covering which highly reflects said laser light is covered with a metal skin less highly reflective for said laser light, namely a metal skin which noticeably absorbs said laser light, comprising the steps of wetting both said covering as well as said base layer with a metal skin composed of a solder metal, and subsequently welding said covering to base layer by means of said laser light, wherein said covering utilized contains a high degree of copper which is first covered with said metal skin of solder metal and, subsequently thereto, said covering as welded to said base layer which likewise contains a high degree of copper and which is likewise covered with a metal skin of solder metal, being welded thereto by means of said laser light, wherein said base layer forms a lamina which has been attached as contact spots on a ceramic circuit carrier of an electronic switching system.

4,697,062

PULSE ARC WELDING MACHINE DISABLED DURING SHORT-CIRCUITS

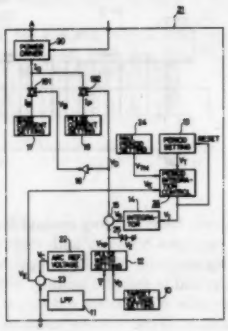
Yoshiro Awano; Hiroshi Suzuki; Takaji Mizuno, all of Aichi; Shigeo Ueguri, Hyogo, and Kenji Higashida, Aichi, all of Japan, assignors to Mitsubishi Denki K.K. and Toyota Jidosha K.K., both of Aichi, Japan

Filed May 16, 1986, Ser. No. 863,920

Claims priority, application Japan, May 16, 1985, 60-104527

Int. Cl.[4] B23K *9/09*

U.S. Cl. 219—130.51 **7 Claims**



1. A pulse arc welding machine, comprising

means for applying a welding current, comprising current pulses with a predetermined period separated by periods of a base current of a level lower than that of said current pulses, to flow from a welding wire to a welding base metal, thereby performing welding;

means for detecting a difference voltage between said welding wire and said base metal;

means responsive to said difference voltage falling below a predetermined level, for inhibiting said applying means from applying a subsequent current pulse and maintaining said base current.

4,697,063

ELECTRIC HEATING ELEMENT

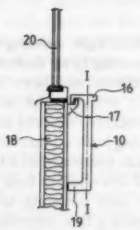
Lars Germundson, Göteborg, Sweden, assignor to L G Innovations AB, Vastra Frolunda, Sweden

Filed Apr. 28, 1986, Ser. No. 856,351

Claims priority, application Sweden, May 7, 1985, 8502235

Int. Cl.[4] H05B *3/28*

U.S. Cl. 219—213 **11 Claims**



1. An electric heating element, comprising:

a core of electrically conductive material, moulded from a mixture having:

between 20 to 30 percentage by weight of graphite powder,

between 35 to 45 percentage by weight of cement and sand in 1:3 proportions,

between 25 to 35 percentage by weight of silicate of potassium, and

between 5 to 10 percentage by weight of water;

a surrounding shell of non-conductive and impermeable concrete;

conductors directly cemented into said core; and

means for connecting said conductors to a source of alternating current.

4,697,064

METHOD AND APPARATUS FOR HEATING SEATS ELECTRICALLY

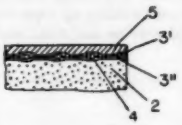
Horst-Dieter Altmann, Gründau-Lieblos, and Eberhard Haupt, Gründau-Rothenbergen, both of Fed. Rep. of Germany, assignors to I.G. Bauerhin GmbH Electro-Technische Fabrik, Gründau-Rothenbergen, Fed. Rep. of Germany

Filed Feb. 4, 1986, Ser. No. 826,068

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1985, 3505652

Int. Cl.[4] H05B *3/36*

U.S. Cl. 219—217 **10 Claims**



1. A process for the electrical heating of seats, comprising

(a) placing at least one elongated heat conductor on a first bearing foil made from a thermoplastic material;

(b) insulating said heaat conductor with heating insulation having a dimensional stability exceeding that of said foil by approximately fifty percent;

(c) spreading said heat conductor in meandering channels as closely as possible to each other;

(d) covering said heat conductor with a second bearing foil substantially identical to said first bearing foil; and

(e) bonding said first and second foil to each other and embedding said heat conductor in said meandering channels therebetween, said heat conductor being movable within said meandering channels.

4,697,065

VEHICLE MIRROR ARRANGEMENT

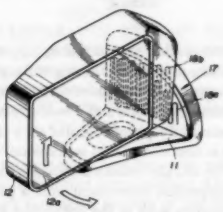
Kenji Ishitsubo, Kanagawa, and Yoshinobu Abe, Tokyo, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Mar. 7, 1986, Ser. No. 837,272

Claims priority, application Japan, Mar. 20, 1985, 60-38941[U]

Int. Cl.[4] B60R *1/06*; H05B *3/20*

U.S. Cl. 219—219 **9 Claims**



1. A vehicle mirror arrangement comprising:

(a) a base attachable to a vehicle body;

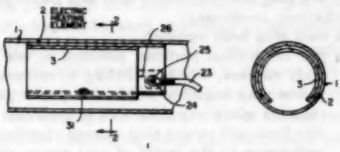
(b) a mirror housing;
(c) means for movably connecting said mirror housing to said base; and
(d) means for heating a gap between said base and said mirror housing, said heating means including an electrically powered heating element mounted on at least a surface of said base opposing said mirror housing.

4,697,066

ELECTRIC HAIR CURLING WAVED WITH IMPROVED HEATING ELEMENT ARRANGEMENT

Dov Z. Glucksman, 1578 Beacon St., Brookline, Mass. 02146

Filed Sep. 30, 1985, Ser. No. 781,790
Int. Cl.[4] A45D 1/04; H05B 3/10; H01C 7/00
U.S. Cl. 219—225 8 Claims



1. In a hair curling wand comprising a handle, a tubular barrel having a far end and a near end, and being attached at said near end to said handle, and means for firmly holding strands of hair wrapped around said barrel, the improvement comprising

a heating element in the form of a flat flexible sheet of a non-conductive material and a resistor in the form of a flexible conductor layer applied to said sheet in a configuration effecting a higher heat output in opposite end areas and a lower heat output in the central area upon application of an electric potential, said heating element being positioned in rolled-up state in said barrel in contiguous relationship with a portion of its inside surface, with the end portions of higher heat output directed towards the respective two ends of said barrel,

terminals on said resistor layer for conductive connection to an electric power source,

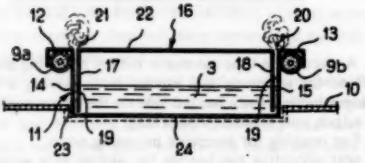
elastic means in said barrel serving to urge said heating element onto the inside wall of said barrel, in the form of at least one elastic slotted compressible cylinder of an initially larger diameter than said barrel diameter, slotted lengthwise and provided with means for cooperation with a tool for compressing the cylinder during insertion of said cylinder in compressed state into said heating element inside said barrel.

4,697,067

STEAM-GENERATING DEVICE AND A COOKING OVEN EQUIPPED WITH SAID DEVICE

Roger Rosset, Rumilly, and Jacques Mayeur, Seynod, both of France, assignors to SEB S.A., Selongey, France

Filed Jan. 22, 1986, Ser. No. 821,002
Claims priority, application France, Jan. 25, 1985, 85 01053
Int. Cl.[4] F22B 1/28; H05B 3/00
U.S. Cl. 219—401 3 Claims



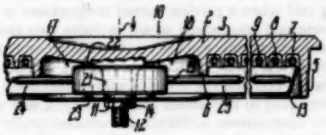
1. A steam generator for an electric oven for food cooking, comprising a tubular electric heating resistor (9) having two legs (9a, 9b) which are parallel to the bottom wall (10) of the oven, wherein a sheet-metal water reservoir (11) is placed between the two legs (9a, 9b) of said heating resistor (9), said reservoir being provided with two flanges (12, 13) formed respectively on two opposite side walls (14, 15) of said reservoir, said flanges (12, 13) being adapted to cover each of the two legs (9a, 9b) of the heating resistor, said reservoir being closed by a sheet-metal cover (16) engaged within said reservoir and provided with side walls (17, 18) which are located in closely spaced relation to the side walls (14, 15) of the reservoir (11) and dip into the water (3) of said reservoir so as to form between said side walls a capillary space (19) which opens outwards in the zone (20) located between the two flanges (12, 13) and the edge (21) of the top wall (22) of the cover (16).

4,697,068

ELECTRIC COOKER HEATING UNIT

Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro Geräte Blanc u. Fischer, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,171
Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3519035; May 25, 1985, 8515560[U]
Int. Cl.[4] H05B 3/76
U.S. Cl. 219—449 40 Claims



1. An electric cooker heating unit, comprising:

a heated unit body having an outer side defining a heating surface, an inner side behind said heating surface and a central zone;

an electric heater means for heating said heating surface, said electric heater means having at least two heating resistors arranged behind said heating surface adjacent to said central zone defining a heated region, the heated region having an inside;

a power control device for operating said heating resistors at different power ratings in power units formed at least partly by alternative switched connections among the heating resistors and a power source;

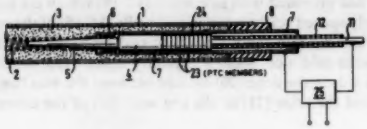
a thermal cutout device located behind the heating surface for disconnecting from the power source at least one of said heating resistors at a predetermined temperature setting, said thermal cutout device having a cutout casing means arranged in the central zone of said unit body and having a temperature sensing means for the unit body, and wherein the thermal cutout device includes a first and a second thermal cutout, the first and second thermal cutouts having two separate temperature sensors and the first and second thermal cutouts being operable at different temperature settings, the cutout casing means of the first and second thermal cutouts being arranged in the central zone and including at least one cutout casing, the first thermal cutout being arranged for disconnecting from the power source a first of said power units and the second thermal cutout means being arranged for disconnecting from the power source a second of said power units.

4,697,069

TUBULAR HEATER WITH AN OVERLOAD SAFETY MEANS

Ingo Bleckmann, Ignaz-Rieder-Kai 11, A-5020 Salzburg, Austria

Filed Aug. 22, 1983, Ser. No. 699,385
Int. Cl.[4] H05B 1/02
U.S. Cl. 219—517 3 Claims



2. A tubular heater comprising: a metallic casing tube; a heating coil of electrical resistance material disposed within the casing tube and spaced inwardly of an inner wall of said casing tube; electrical insulation material carried within said casing tube, said heating coil being embedded in said electrical insulation material; at least one tubular element positioned radially inwardly of and adjacent an end of the casing tube and having its axis concentric to the axis of the casing tube, said tubular element having a length substantially less than that of said casing tube to permit bending of said casing tube between the ends thereof; connection means carried within said tubular element and electrically connected with said heating coil; safety element means electrically connectable to a source of electrical power and replaceably positioned within said tubular element and spaced axially outwardly of said heating coil, said safety element means being electrically connected with said connection means for interrupting the flow of current to the heating coil when a predetermined temperature is exceeded,

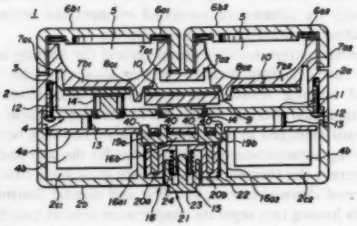
wherein said connection means includes two electrical connections extending out of an end of said casing tube, one of said connections directly electrically connected to said heating coil and the other of said connections electrically connected to said safety element means, and wherein the two connections are arranged concentrically relative to each other.

4,697,070

CONTACT LENS STERILIZATION DEVICE

Isao Kai, Kameoka, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Mar. 26, 1986, Ser. No. 844,364
Claims priority, application Japan, Apr. 22, 1985, 60-87054; Apr. 22, 1985, 60-60866[U]; Apr. 22, 1985, 60-60867[U]
Int. Cl.[4] H05B 3/10
U.S. Cl. 219—521 9 Claims



8. A contact lens sterilization device, comprising:

a main body casing formed as an integral structure, with a main cavity and a power plug storage chamber being defined in said main body casing and being substantially sealed off from communication with one another by an insulating wall member, said main cavity further being substantially sealed off from communication with the outside, a contact lens sterilization chamber being at least partly defined by a portion of said main body casing which also defines one part of said main cavity;

a control system, comprising at least one electronic component and a printed circuit board, accomodated in said main cavity of said main body casing;

a heating system, likewise accomodated in said main cavity of said main body casing, and selectively actuated by said control system to produce heat and to apply said heat to said portion of said main body which partly defines said contact lens sterilization chamber; a pair of fixed contacts fitted from said main cavity of said main body casing through said insulating wall member to said plug storage chamber and electrically connected in said main cavity to portions of said printed circuit board;

and:

a power plug assembly, received in said power plug storage chamber, comprising:

a main plug body member;

a pair of terminal portions, mounted to said main plug body member, which according to movement of said power plug assembly within said power plug storage chamber selectively either can be projected to the outside from said power plug storage chamber or can be withdrawn to the inside of said power plug storage chamber;

a knob, an actuation portion of which protrudes to the outside of said power plug storage chamber;

and:

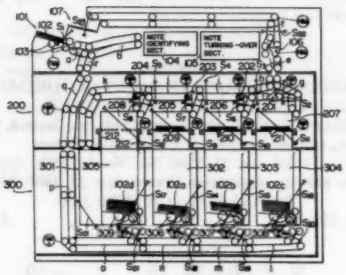
a spring which biases said knob and said main plug body member apart from one another so as to bias said actuation portion of said knob towards the outside and so as to bias said terminal portions each to contact one of said pair of fixed contacts.

4,697,071

CIRCULATION TYPE AUTOMATIC MONEY RECEIVING AND PAYING MACHINE WITH NOTE SIDE IDENTIFYING AND NOTE TURNING-OVER SECTIONS

Shigeaki Hiraoka, and Takamasa Seo, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Continuation of Ser. No. 596,350, Apr. 3, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 906,674
Claims priority, application Japan, Nov. 29, 1983, 58-225163
Int. Cl.[4] B07C 5/00; B65H 29/00, 29/40
U.S. Cl. 235—379 1 Claim



1. A circulation type automatic money receiving and paying machine for receiving and paying notes having a first side distinguishable from a second side on the reverse side thereof and edges, said machine comprising:

a first opening for receiving incoming notes;

a note accepting mechanism for successively accepting incoming notes inserted into said first opening;

a note accepting conveying path;

a note return conveying path;

the note accepting conveying path and the note return conveying path having a common conveying path;

note identifying means for identifying whether or not the incoming notes are false, a denomination of the notes, and the first and second sides of said notes;

a note turning-over section located downstream of said note identifying means, said section having a first conveying path for conveying notes identified by said note identifying means as having their first side facing in a predetermined direction, a second conveying path for conveying notes identified by said note identifying means as having their second side facing in said predetermined direction, the notes having said second side facing in said direction being turned over during conveying thereof by said conveying path, said first and second paths diverging at a junction located between said paths, a turning-over plate located at said junction, said plate being selectively movable to and from a position where it abuts on each of the leading edges of the notes conveyed successively through said note turning-over section, a roller located near said junction for transferring a note that has abutted said turning-over plate to said second path, said roller having vanes thereon, and a third conveying path located downstream of said first and second conveying paths, said first and second paths converging at said third conveying path, and third path passing correctly oriented notes;

temporary holding sections for temporarily holding turned-over notes in accordance with their monetary denominations;

cassette sections, downstream of said holding sections, for receiving notes temporarily held in said holding sections and accommodating the notes in a stack in accordance with their monetary denominations;

note releasing mechanisms, located downstream of said cassette sections, for successively releasing notes from said cassette sections in accordance with monetary denominations;

a released note conveying path for conveying notes released from said cassette sections;

the note common conveying path receiving incoming notes from said first opening, or released note conveyed by said released note conveying path;

a second opening for returning incoming false notes according to a discrimination of truth from falsehood by said note identifying means and for ejecting released notes;

the return conveying path conveying false notes and released notes from said note turning-over section to said second opening;

a distribution conveying path located downstream of said note turning-over section and between said note turning-over section and said temporary holding sections, said distribution conveying path distributing true notes from among incoming notes carried through said note turning-over section to said temporary holding sections according to the monetary denominations determined by said note identifying means; and

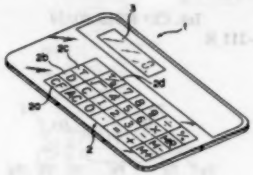
a switch located between said third conveying path of said note turning-over section and said distribution conveying path and between said third conveying path and said return conveying path, said switch receiving notes from said third conveying path and switching notes carried through said note turning-over section to said return conveying path or to said distribution conveying path.

4,697,072

IDENTIFICATION CARD AND AUTHENTICATION SYSTEM THEREFOR

Shigeyuki Kawana, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1985, Ser. No. 769,872
Claims priority, application Japan, Sep. 7, 1984, 59-187406
Int. Cl.[4] G06K 5/10
U.S. Cl. 235—380 **15 Claims**



1. An identification card comprising:

input means having a keyboard for entering secret data unique to a card holder and transaction data;

calculating means for calculating encrypted data as a sales approval number (SAN) by using at least the secret and transaction data entered by said input means in accordance with a predetermined encryption algorithm; and

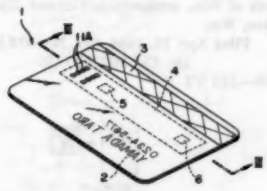
display means for visually displaying the encrypted data calculated by said calculating means, whereby the card holder and a transaction with the card in a store are authenticated in accordance with said encrypted data.

4,697,073

IC CARD

Kazuya Hara, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1986, Ser. No. 833,058
Claims priority, application Japan, Mar. 4, 1985, 60-43301
Int. Cl.[4] G06K 19/00
U.S. Cl. 235—487 **13 Claims**



1. An IC card comprising:

at least one IC chip having electrical terminals;

a sheet-like structure having one surface and supporting said IC chip;

internal connecting members formed on said one surface of said sheet-like structure and including a plurality of connection pads to be connected to the external device and wiring patterns connecting said connection pads to said terminals of said IC chip;

a sheet film having openings facing said connection pads and covering said one surface of said sheet-like structure; and

contact segments formed on said connection pads, having a thickness substantially equal to the thickness of said sheet film and fitted in said first openings.

4,697,074

THERMALLY IMPROVED PHOTODETECTOR HAVING A ROUGHENED, RECESSED, RAISED OR INCLINED LIGHT RECEIVING SURFACE

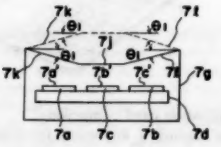
Kazuo Ito, Habikino; Toshiyuki Kudo, Hirakata, and Ritsuo Hama, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 11, 1985, Ser. No. 807,562

Claims priority, application Japan, Dec. 17, 1984, 59-191049[U]; Dec. 17, 1984, 59-191050[U]; Feb. 12, 1985, 60-18248[U]

Int. Cl.[4] H01J 40/14

U.S. Cl. 250—211 R 6 Claims



6. A photodetector for use in an optical head system, comprising:

a photocell assembly including,

a substrate, and

at least one photocell formed on the substrate and having a light receiving face, said photocell assembly being completely embedded in a transparent resin molded body, said resin molded body having a light receiving surface defined therein so as to permit an incoming light incident thereupon to travel directly to the light receiving face of the photocell, said light receiving surface being recessed or raised, such that a portion of the incoming light directed onto the light receiving face of the photocell and reflected outwardly toward the light receiving surface is prevented from being reflected by the light receiving surface back to said light receiving face of the photocell.

4,697,075

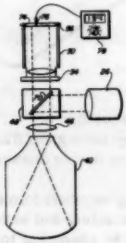
X-RAY IMAGING SYSTEM CALIBRATION USING PROJECTION MEANS

Hartog J. Roos, Brookfield, and Edward F. Schilling, West Allis, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Apr. 11, 1986, Ser. No. 850,515

Int. Cl.[4] H01J 31/50

U.S. Cl. 250—213 VT 10 Claims



1. In an x-ray imaging system of the type including an x-ray source, an image intensifier tube for converting received x-ray radiation to optical images to be recorded photographically and/or electronically apparatus for in situ evaluation of the image intensifier tube performance comprising:

a cylindrical housing having first and second ends;

a lens mounted in said first end of said housing, said lens having a focal point at infinity;

means for mounting said first end to the imaging system in position for receiving light from the image tube;

a removable light diffuser mounted in said second end of said housing, said lens and said diffuser being arranged to be positioned exactly in the focal plane of said lens and displaying on said diffuser an image having a light intensity distribution proportional to the light intensity of the image produced by the image intensifier tube; and

light intensity measuring means for evaluating the light intensity distribution on said diffuser for determining the light intensity produced by the image intensifier tube.

4,697,076

LIGHTING DEVICE FOR INSPECTING OBJECTS FOR FLAWS

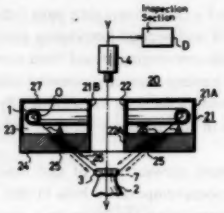
Hajime Yoshida, Tokyo, Japan, assignor to Hajime Industries, Ltd., Tokyo, Japan

Filed May 20, 1985, Ser. No. 735,952

Claims priority, application Japan, May 24, 1984, 59-105187

Int. Cl.[4] G01N 21/47; B07C 5/342

U.S. Cl. 250—223 B 5 Claims



1. An apparatus for inspecting objects for flaws having a photoelectric conversion sensor for receiving a reflected image of said object and producing an electric signal indicative thereof and a processor for receiving said electrical signal and judging whether said object is flawed or not, a lighting device for illuminating said object comprising a housing interposed between said sensor and said object, said housing being made of opaque material having a ring-shaped space and a central through hole axially aligned with said sensor and said object, a ring-shaped light source mounted within the ring-shaped space in said housing, and means interposed between said light source and said object for controlling the incidence of light from said light source on said work object, said controlling means comprising an opaque body having a central through-hole and a plurality of light paths disposed thereabout, said controlling means being mounted so that the central through-hole of said controlling means is coincident with the central through-hole of said housing and said light paths are arrayed in a predetermined direction such that the light passing therethrough onto said object will normally not be reflected through the central through-holes onto said sensor and will be reflected onto said sensor only when said object is flawed.

4,697,077

VANE ENCODER ASSEMBLY FOR ADJUSTING AN OPTICAL ENCODER IN A DATA STORAGE DEVICE

Otto K. Weber, and Sang S. Rhee, both of Chatsworth, Calif., assignors to Computer Optical Products, Inc., Chatsworth, Calif.

Filed May 12, 1986, Ser. No. 861,987

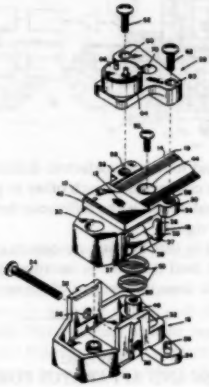
Int. Cl.[4] G01D 5/34; G11B 5/56, 21/24

U.S. Cl. 250—231 SE 20 Claims

1. An improvement in an apparatus for relative spatial adjustment of a first and second planar object while maintaining

relative angular orientation of said first and second object, said improvement comprising:

four-bar linkage means coupled to a selected one of said first and second objects, said four-bar linkage means for transporting said selected one of said first and second objects in a predetermined direction while maintaining angular orientation of said selected one of said first and second objects with respect to said predetermined direction constant; and



adjustment means for applying a force to said four-bar linkage means causing said four-bar linkage means to transport said selected one of said first and second objects in said predetermined direction,

whereby said selected one of said first and second objects is transported in said predetermined direction thereby altering the relative spatial relationship between said first and second objects while maintaining relative angular orientation of said first and second objects constant.

4,697,078

METHOD FOR QUALITY CONTROL OF COUNTING LOGS

Russel R. Randall, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Apr. 10, 1985, Ser. No. 722,098

Int. Cl.[4] G01V *5/00*

U.S. Cl. 250—256 **14 Claims**

1. In a well logging method utilizing a counting measurement from a counting log, a method for quantitatively measuring the repeatability of a parameter, wherein said parameter is a function of the counts from said counting measurement, comprising the steps of:

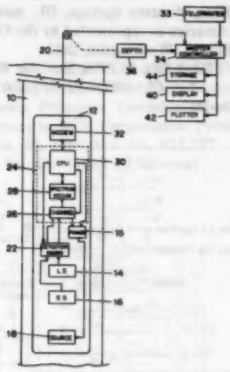
gathering counting data for each of a plurality of vertical depth increments, said increments being less than the vertical depth resolution of said counting log;

deriving from said counting data a value of said parameter for each of said plurality of increments;

deriving from a first and second parameter value a value indicative of the statistical deviation between said first and second values, said first and second values being from consecutive increments;

filtering a plurality of statistical values to generate said quantitative measure of the repeatability of said parameters; and

filtering by use of a variable weighted filter a preselected number of said parameter values, said number being dependent upon said quantitative measure of the repeatability of said parameters, wherein said quantitative measure



controls the weight of said filter and said number is preselected as a function of said weight of said filter.

4,697,079

ANALYZING FLUID FLOWS WITHIN HOLLOW BODIES

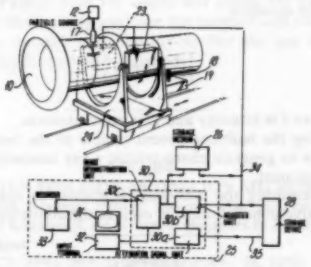
Peter A. E. Stewart, Bristol; Michael R. Hawkesworth, Birmingham, and Roger C. Witcomb, Cheltenham, all of England, assignors to Rolls-Royce plc, London, United Kingdom

Continuation-in-part of Ser. No. 318,939, Nov. 6, 1981. This application Mar. 22, 1985, Ser. No. 714,868

Claims priority, application United Kingdom, Mar. 23, 1984, 8407655

Int. Cl.[4] G21H *5/02*

U.S. Cl. 250—303 **12 Claims**



1. A method of producing a representation of a fluid flow, comprising:

injecting into the fluid a quantity of particles capable of following the flow, the particles being labelled with a positron-emitting isotope, each particle being capable of bringing at least approximately ten percent of the positrons emitted within said particle to rest before they escape thereform, whereby gamma rays are emitted from the particles;

detecting said gamma rays emitted from the particles, by detection apparatus which produces output signals in response to said gamma rays; and

producing from the output signals a representation of the fluid flow.

4,697,080

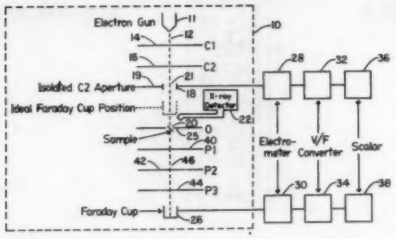
ANALYSIS WITH ELECTRON MICROSCOPE OF MULTIELEMENT SAMPLES USING PURE ELEMENT STANDARDS

Wayne E. King, Western Springs, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 6, 1986, Ser. No. 818,308

Int. Cl.[4] G01N *23/225, 23/223*

U.S. Cl. 250—307 **3 Claims**



1. A method of determining the composition of a multielement sample containing a plurality of predetermined elemental components comprising the steps of

providing single component samples of each component having at least two thicknesses,

directing a beam of electrons at each sample to generate characteristic x-ray intensities,

simultaneously measuring the x-ray intensities (I) and beam dosage (ϕ) associated with said beam of electrons,

determining a K factor by

$$\frac{S_B}{S_A} \quad \frac{\rho A}{\rho B}$$

where "S_B" and "S_A" are the slopes of curves of I/ϕ versus thickness determined from said single component samples at said thicknesses and ρA and ρ_B are the densities for components A and B, the K_{AB} factor being a constant in the equation

$$\frac{C_A}{C_B} = K_{AB}\frac{I_A}{I_B}$$

where I is intensity and C is concentration,

exposing the multicomponent sample to the beam of electrons to generate characteristic x-ray intensities for each component,

and measuring the individual intensities to determine the relative concentration of each in the above equation.

4,697,081

INFRA-RED RADIATION DETECTOR DEVICES

Geoffrey Baker, Southampton, England, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jan. 30, 1986, Ser. No. 824,031

Claims priority, application United Kingdom, Feb. 8, 1985, 8503240

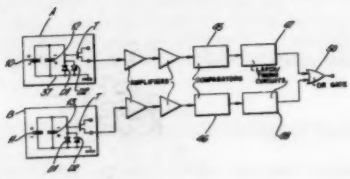
Int. Cl.[4] G01J *1/00*

U.S. Cl. 250—338 **11 Claims**

1. An infrared radiation detector device comprising:

a first dual detector having first and second pyroelectric detector elements spaced from each other, each pyroelectric detector element producing an individual output signal and comprising a pyroelectric material having opposite surfaces with electrodes on the opposite surfaces, the first and second pyroelectric detector elements being electrically connected to each other to produce a detector output signal which is the difference between the individual output signals; and

a second dual detector having third and fourth pyroelectric detector elements spaced from each other, each pyroelectric detector element producing an individual output signal and comprising a pyroelectric material having opposite surfaces with electrodes on the opposite surfaces,



the third and fourth pyroelectric detector elements being electrically connected to each other to produce a detector output signal which is the difference between the individual output signals;

characterized in that the first pyroelectric detector element of the first dual detector is interdigitated with the third pyroelectric detector element of the second dual detector.

4,697,082

PROCESS AND APPARATUS FOR TESTING TRANSPARENT MATERIAL WEBS, PARTICULARLY PLATE GLASS RIBBONS

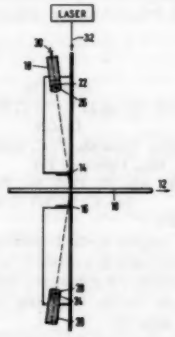
Lutz Bartelsen, Hamminkeln, Fed. Rep. of Germany, assignor to Flachglas Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 807,795

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445580

Int. Cl.[4] G01N *21/89*

U.S. Cl. 250—341 **15 Claims**



1. A process for testing a transparent material web for material defects, comprising the steps of:

conveying a web in its longitudinal direction;

scanning a conveyed web with a laser-produced flying spot over its width and at substantially right angles to the conveying plane and direction;

measuring forward and back scattering produced by the material defects in, in each case, a detection plane sloping with respect to the scanning plane;

deriving electrical signals from the measured values; and

processing said signals for material defect identification,

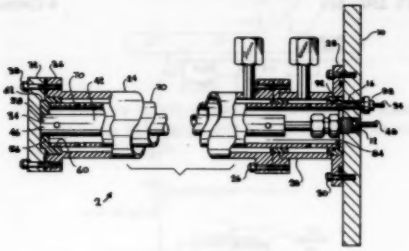
characterized in that the light spot source comprises a laser operating in the IR-range.

4,697,083

ION DETECTOR

Andrew M. Tullis, Livermore, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jan. 30, 1986, Ser. No. 824,037
Int. Cl.[4] H01J 47/02
U.S. Cl. 250—374 19 Claims



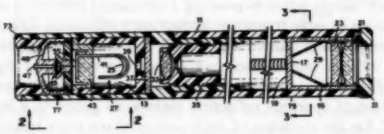
1. An improved ionization detection device comprising:
an ionization chamber;
a central electrode within said chamber;
a cylindrical electrode member within said chamber; and
a collet frictionally fitted around at least one of said electrodes, said collet having electrical contact means carried in a groove therein to contact a surface of at least one of said electrodes.

4,697,084

FIBER-TYPE DOSIMETER WITH IMPROVED ILLUMINATOR

Richard J. Fox, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 23, 1985, Ser. No. 812,706
Int. Cl.[4] G01T 1/14; H01J 47/04
U.S. Cl. 250—376 5 Claims



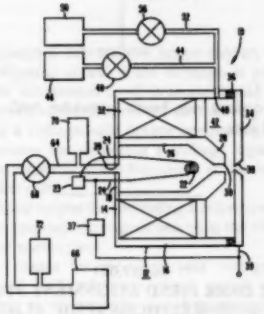
1. In a dosimeter of the type comprising a tubular barrel, an ionization chamber disposed coaxially within said barrel and comprising an electrometer having a fiber supported by a frame, a microscope means disposed in a viewing end of said barrel for viewing the position of said fiber along a graduated scale, and means for charging said electrometer including a charging pin movably disposed along the axis of said barrel at the opposite light receiving end thereof, the improvement comprising:
a totally reflecting condenser disposed within said barrel concentrically about said charging pin, said condenser comprising a concave paraboloidal light reflecting surface having a light conducting path passing through the center of said concave paraboloidal reflecting surface and a convex hyperboloidal light reflecting surface, said concave paraboloidal surface disposed to receive light rays from said light receiving end of said barrel and reflect said light rays onto said hyperboloidal surface which is disposed to further reflect said light rays through said light path passing through said concave paraboloidal surface to a focal point coincident with the mid-scale position of said fiber.

4,697,085

APPARATUS AND METHOD FOR PRODUCING IONS

Charles W. Magee, West Windsor Township, Mercer County, and Richard E. Honig, Princeton Township, Mercer County, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jan. 28, 1986, Ser. No. 823,257
Int. Cl.[4] H01J 27/00
U.S. Cl. 250—426 5 Claims



1. In an ion beam source which includes within a housing a filament cathode, an anode spaced from the cathode and having an opening therethrough, an intermediate electrode between the anode and the cathode and having an opening therethrough in alignment with the opening in the anode, means for providing a magnetic field within said housing, and means for admitting a gas to be ionized into the housing between the anode and the intermediate electrode to create an arc discharge, the improvement comprising
an outlet opening through the housing on the side of the cathode away from the anode and means for causing a flow of the ionizing gas over the cathode and out of the housing through said opening so that the gas removes impurities formed at the cathode.

4,697,086

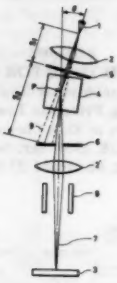
APPARATUS FOR IMPLANTING ION MICROBEAM

Tohru Ishitani, Sayama; Hifumi Tamura, Hachioji, and Kaoru Umemura, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

PCT No. PCT/JP84/00372, § 371 Date Apr. 24, 1985, § 102(e) Date Apr. 24, 1985, PCT Pub. No. WO85/01389, PCT Pub. Date Mar. 28, 1985
PCT Filed Jul. 20, 1984, Ser. No. 732,759
Claims priority, application Japan, Sep. 14, 1983, 58-168137
Int. Cl.[4] H01J 37/317, 37/20
U.S. Cl. 250—492.2 2 Claims

1. An apparatus for implanting an ion microbeam comprising an ion source; beamfocusing means for accelerating ions emitted from said ion source, focusing said ions, separating said ions by mass, and deflecting said ions; and a sample stage which minutely moves a sample; said means including a Wien filter in which a uniform electric field intersects a uniform magnetic field at right angles so as to separate said ions in said beamfocusing means according to mass; said beamfocusing means focusing said ions so that a focusing point of said ions is within

said Wien filter; and a linear optical axis of said beam-focusing means is bent within said Wien filter; wherein the point at



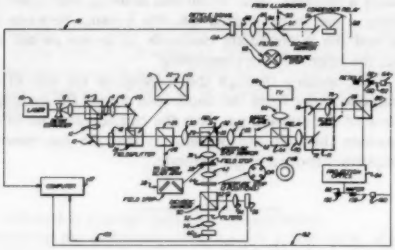
which said optical axis bends coincides with said focusing point of said ions.

4,697,087

REVERSE DARK FIELD ALIGNMENT SYSTEM FOR SCANNING LITHOGRAPHIC ALIGNER

Frederick Y. Wu, Cos Cob, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jul. 31, 1986, Ser. No. 868,506
Int. Cl.[4] G01V *9/04*; G01B *11/27*
U.S. Cl. 250—548 **22 Claims**



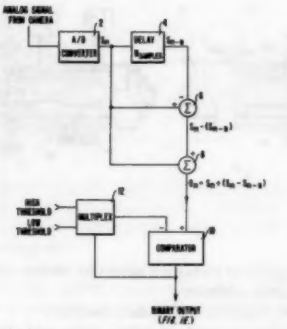
22. A method for aligning a wafer to a reticle comprising:
providing a wafer having a wafer target thereon;
providing a reticle having a reticle target therethrough;
illuminating said wafer target with an alignment image having a predetermined geometry;
scanning said wafer and said reticle relative to said alignment image;
reimaging a portion of said alignment image, which extends beyond said wafer target, onto said reticle target;
collecting light backscattered from said wafer target as said wafer target is scanned past said alignment image;
detecting said backscattered light and providing a first signal proportional thereto;
detecting the portion of said alignment image passing through said reticle target and providing a second signal proportional thereto;
computing alignment errors, magnification errors and rotational errors between said wafer and said reticle based on said first signal and said second signal.

4,697,088

METHOD OF AND APPARATUS FOR DISCRIMINATING SHARP EDGE TRANSITIONS PRODUCED DURING OPTICAL SCANNING OF DIFFERENTLY REFLECTIVE REGIONS

Robert Bishop, Brookline, Mass., assignor to Beltronics, Inc., Brookline, Mass.

Filed Jun. 24, 1985, Ser. No. 747,997
Int. Cl.[4] G01B *11/10*
U.S. Cl. 250—561 **6 Claims**



1. A method of discriminating sharp edge transitions produced during the scanning of differently reflective regions on a surface with insensitivity to subsequent spurious reflection variations in said regions, that comprises, scanning the surface to produce an output having one or more spaced pairs of sharp edge transitions each defining impulses representing relatively highly reflective regions spaced along the surface; converting said output into digital sampling signals; continually delaying N successive sampling signals where N represents the number of sample signals necessary to define the edge transition region, with N being selected as the number of samples required to define the slope of the transition region for the desired discrimination between the highly reflective regions and subsequent spurious reflection variations of different slope and amplitude characteristics; subtracting each sample signal from the previous Nth sample signal to produce a substantial difference signal indicating an edge transition; adding each difference signal and a corresponding sample signal such that only the edge transitions will be emphasized; and comparing the added signals with first and second thresholds that are selected to insure rejection of spurious reflection signals, to generate a binary "one" for the duration of each pair of sharp edge transitions and a "zero" between each pair.

4,697,089

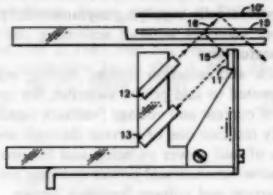
DUAL WAVELENGTH SENSOR WHICH EMPLOYS OBJECT AS PART OF A CORNER REFLECTOR

David J. Drage, Sebastopol, Calif., assignor to Tegal Corporation, Novato, Calif.

Filed Jun. 18, 1986, Ser. No. 875,820
Int. Cl.[4] G01N *21/86*; G01V *9/04*
U.S. Cl. 250—561 **9 Claims**

1. Optical detecting means comprising:
a first means for emitting light at a first wavelength;

a second means for emitting light at a second wavelength; detector means; and



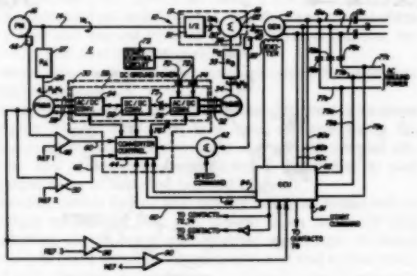
corner reflector means, including an article to be sensed, for re-directing light from said first and second emitters to said detector means.

4,697,090

STARTING SYSTEM FOR AN ELECTRICALLY-COMPENSATED CONSTANT SPEED DRIVE

Robert C. Baker, Loves Park, and Bryan W. Dishner, Roscoe, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 23, 1986, Ser. No. 945,875
Int. Cl.[4] F02N *11/04*
U.S. Cl. 290—4 R **14 Claims**



1. A starting system for an electrically-compensated constant speed drive (ECCSD) which develops constant speed motive power from variable speed motive power developed by a prime mover, the ECCSD including a first permanent magnet machine having a motive power shaft coupled to an output shaft of the prime mover, a differential speed summer having a first input shaft coupled to the output shaft of the prime mover, a second input shaft coupled to a motive power shaft of a second permanent magnet machine and an output shaft coupled to a generator and a power converter interconnecting electrical power windings of the first and second permanent magnet machines, comprising:

means coupled to the electrical power windings of the second permanent magnet machine for operating the second permanent magnet machine as a motor to thereby cause the differential output shaft to rotate at increasing speeds; and

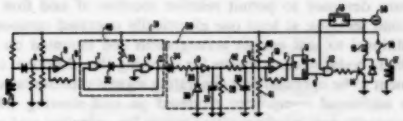
means coupled to the generator and responsive to the differential output shaft speed achieving a predetermined speed for applying power to windings of the generator to cause same to operate as a motor and thereby develop motive power which is returned through the differential and the prime mover output shaft to the prime mover to start same.

4,697,091

SLIP DETECTING DEVICE FOR A PRIME MOVER

Yasuji Tamura, Ojima, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Jul. 5, 1985, Ser. No. 752,066
Claims priority, application Japan, Jul. 5, 1984, 59-100633[U]
Int. Cl.[4] B61C *15/08*
U.S. Cl. 290—45 **17 Claims**



1. In an apparatus driven by a prime mover, a device for providing a slippage signal when slippage is present in the power transfer mechanism used to connect said apparatus to said prime mover, said prime mover also driving an alternator for generating a voltage, said device comprising:

detecting means for detecting a voltage signal frequency which corresponds to the frequency of the output voltage of said alternator;

reference signal means for providing a reference speed signal which corresponds to a speed less than the idling speed of said prime mover; and

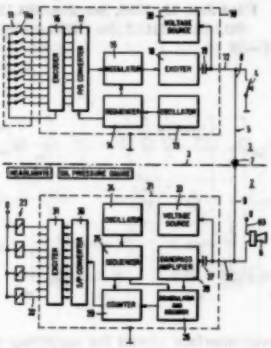
comparator means for receiving said voltage signal frequency and said reference speed signal, wherein said comparator means provides said slippage signal when said speed signal corresponding to said voltage signal frequency is less than said reference speed signal.

4,697,092

CONTROL SYSTEM FOR ELECTRICALLY OPERATED COMPONENTS OF AN AUTOMOTIVE VEHICLE

Peter Roggendorf, and Rainer Buchmann, both of Frankfurt, Fed. Rep. of Germany, assignors to Petri AG, Aschaffenburg, Fed. Rep. of Germany

Filed Jul. 16, 1984, Ser. No. 630,935
Int. Cl.[4] H01H *9/00*
U.S. Cl. 307—10 R **7 Claims**



1. An automotive vehicle comprising a vehicle body having a chassis; a steering wheel mounted on said vehicle body for rotation relative thereto; an electrically energized emitter arrangement for emitting an acoustical warning signal mounted on said vehicle body; a source of electrical energy for said emitter arrangement mounted on said vehicle body; a switch for activating and deactivating said emitter arrangement mounted on said steering wheel; electrical conductor

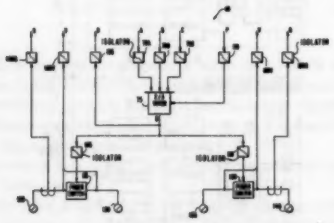
means connecting said emitter arrangement with said source and said switch, said conductor means including a first conductor which connects said emitter arrangement with said switch and a second conductor which connects said emitter arrangement with said source, and said first conductor having a first section which is connected with said switch and is rotatable with said steering wheel and a second section which is connected with said emitter arrangement and is fixed, said first and second sections being provided with cooperating collector means designed to permit relative rotation of said first and second sections; at least one electrically operated component additional to said emitter arrangement and mounted on said vehicle body; selector means for selecting the additional component to be operated and generating signals representative of the additional component mounted on said steering wheel; electrically energized operating means for operating said additional component in response to the signals generated by said selector means mounted on said vehicle body; and signal processing means interposed between said selector means and said operating means, said processing means including a first signal processing unit mounted on said steering wheel, and said first processing unit having first input means connected with said selector means, a source of carrier signals, an encoder for converting the signals from said selector means into binary codes, a modulator for modulating the the carrier signals so that the latter incorporate the binary code and first output means connected with said first section of said first conductor, said processing means further including at least one second signal processing unit mounted on said vehicle body and said second processing units having a demodulator for demodulating the signals generated by said modulator, second output means connected with said operating means and second input means connected with said second section of said first conductor, said first processing unit being designed to generate high frequency output signals and each of said first output means and said second input means having a coupling element which constitutes a d.c. barrier.

4,697,093

TESTABLE, FAULT-TOLERANT POWER INTERFACE CIRCUIT FOR CONTROLLING PLANT PROCESS EQUIPMENT

James F. Sutherland, Plum Boro, and William L. Miller, West Deer Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 23, 1985, Ser. No. 694,190
Int. Cl.[4] G21C *7/36*; G08B *23/00*
U.S. Cl. 307—38 **21 Claims**



1. A power interface circuit for supplying power from a power supply to a plant process control apparatus in dependence upon n input signals, comprising:

voter means, operatively connectable to receive the input signals, for generating a control signal when at least m of the n input signals indicate that the control signal should be generated;

power switches, operatively connected to said voter means and operatively connectable to the power supply and the process control apparatus, for supplying the power to the process control apparatus in dependence upon the control signal;

test pulse means, operatively connected to said voter means, for periodically supplying asymmetrical pulses to test said power switches without activating the process control apparatus; and

feedback and isolation means, having inputs operatively connected to said power switches, for outputting at least one of current and voltage feedback signals which respectively indicate one of current through and voltage across each of said power switches and for providing electrical isolation between said power switches and the at least one of current and voltage feedback signals

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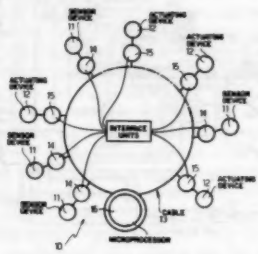
4,697,094

SYSTEM FOR INTERCONNECTING SENSOR AND ACTUATING DEVICES

Mario Palazzetti, Avigliana, Italy, assignor to Fiat Auto S.p.A., Turin, Italy

Filed Feb. 3, 1986, Ser. No. 825,234
Claims priority, application Italy, Feb. 4, 1985, 67101 A/85
Int. Cl.[4] H02J *13/00*
U.S. Cl. 307—40 **13 Claims**



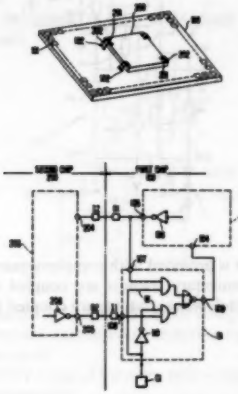
1. A system connecting with sensor devices for controlling operation of actuating devices comprising at least one cable having a preselected number of signal conducting lines, a plurality of interface units comprising flip-flop circuit containing counter stations, each of said interface units connected between said conducting lines of said cable and a respective sensor and actuating device, first means providing scanning signals, during scanning cycles of said stations, on first and second of said signal conducting lines for cyclically and sequentially enabling, by way of said interface units, connection of said sensor and actuating devices to a third line of said cable, which said third line is supplied with a sensing signal which is a function of a parameter detected by said sensor devices, second means in the interface units associated with said sensor devices for providing an input signal to third means in associated interface units for said actuating devices, said second and third means being like means in series connection in said second line comprising an interrupted and thus a non-continuous line, a preselected one of the interface units for a preselected actuating device being selectively operated under control of a preselected sensing device as a function of said sensing signal supplied to said third line and by the scanning signal on said first and second lines.

4,697,095

CHIP-ON-CHIP SEMICONDUCTOR DEVICE HAVING SELECTABLE TERMINAL CONNECTIONS

Shigeru Fujii, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 2, 1985, Ser. No. 782,931
Claims priority, application Japan, Oct. 5, 1984, 59-209236
Int. Cl.[4] H03K 17/693
U.S. Cl. 307—243 15 Claims



1. A semiconductor device including a first chip and a second chip mounted on said first chip, said first and second chips having first and second internal circuits formed thereon, respectively, said first chip comprising:

an input node and an output node provided for said first internal circuit;

and input terminal and an output terminal formed at an inner region of said first chip, said input terminal being for receiving incoming signals from said second internal circuit, and said output terminal being connected to said output node of said first internal circuit;

a selecting circuit having first and second input nodes and an output node, said first and second input nodes of said selecting circuit being connected to said output terminal and said input terminal, respectively, and said output node of said selecting circuit being connected to said input node of said first internal circuit; and

a control signal input terminal for receiving a control signal for controlling said selecting circuit, said control signal input terminal being formed at a peripheral region of said first chip and connected to said selecting circuit,

wherein said selecting circuit switches said input node of said first internal circuit to connect to said input terminal or to said output terminal, according to said control signal.

4,697,096

HIGH VOLTAGE SOLID STATE SWITCH

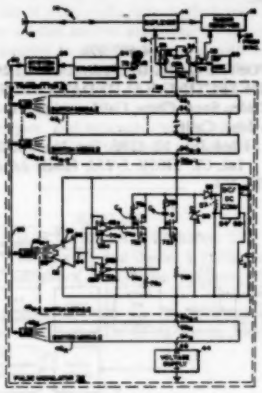
George M. Conrad, Marlboro, and Kenneth M. Smalley, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 707,931, Mar. 4, 1985, abandoned. This application Oct. 23, 1986, Ser. No. 921,836
Int. Cl.[4] H03K 17/56, 3/42, 17/687
U.S. Cl. 307—246 15 Claims

1. A switching circuit for electrically coupling, or decoupling, a voltage supply to, or from, a load selectively in accordance with an electrical control signal, such circuit comprising:

(a) means for converting the electrical control signal into a radiant energy signal; and,

(b) a plurality of switching modules serially coupled between the load and the voltage supply, each one of the modules being at a different reference potential, each one of such modules including: a switching transistor; means, responsive to the radiant energy signal, for providing a drive voltage to drive such transistor into either a conducting or a non-conducting condition selectively in accordance with the radiant energy; energy storing means, such energy storing means being coupled to the voltage supply for storing energy therein when such voltage source is decoupled from the load, such storing means



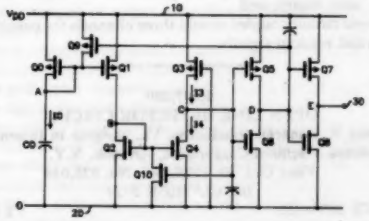
applying power to such drive voltage providing means when the voltage supply is coupled to the load; and means, coupled to such transistor, for regulating such drive voltage to a substantially constant predetermined voltage with respect to the reference potential of such module to maintain a substantially constant current from such voltage source through each of such transistors to such load during the conducting condition of such transistor.

4,697,097

CMOS POWER-ON DETECTION CIRCUIT

Andreas Rusznyak, Chene-Bougeries, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 12, 1986, Ser. No. 854,289
Int. Cl.[4] H03K 3/01, 5/153, 5/159, 5/22
U.S. Cl. 307—296 R 11 Claims



1. A CMOS power-on detection circuit comprising first and second power supply lines; capacitive means coupled between said supply lines, in which a charging current is generated in response to a rising supply potential wherein the charging current in the capacitive means may be generated through first diode means connected in series with the capacitive means between the first and second supply lines and forming a first node therebetween; first and second complementary MOS

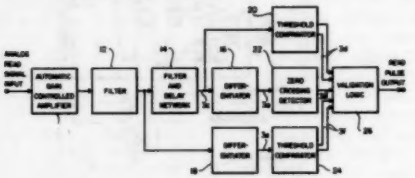
transistors connected in series between the first and second supply lines with their drain electrodes connected together to form a second node, the gate electrode of the first transistor being coupled to one of said supply lines so that the conductance of that transisitor increases as the supply potential rises; means coupling said second transistor to said capacitive means for driving the second transistor with a potential derived from the charging current, an indication of the supply potential having attained a predetermined or maximum value being provided by a predetermined potential change at the said second node.

4,697,098

COMPOSITE GATE GENERATOR CIRCUIT FOR DETECTING VALID DATA SIGNALS

Robert L. Cloke, Santa Clara, Calif., assignor to Priam Corporation, San Jose, Calif.

Filed Jun. 10, 1985, Ser. No. 743,037
Int. Cl.[4] H03K *5/153*; H04B *1/110*
U.S. Cl. 307—354 **7 Claims**



1. A gate generator circuit for validating and passing valid readout signals to an output utilization circuit comprising:
a source of input signals;
filtering means coupled to said source for filtering said input signals;
a first channel comprising:
a first differentiator means coupled to said filtering means for differentiating the filtered signal; and
a first threshold comparator coupled to said first differentiator means for comparing the differentiated signal from said first differentiator means to a fixed reference voltage;
a second channel comprising:
a second threshold comparator coupled to said filtering means for comparing an undifferentiated signal to a selected fixed reference voltage;
a third channel comprising:
a second differentiator means coupled to said filtering means for differentiating the filtered signal; and
a zero crossing detector coupled to said second differentiator means; and
a logic circuit coupled to said three channels for passing only valid readout signals.

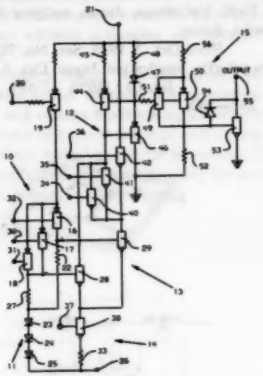
4,697,099

OPEN LINE DETECTOR CIRCUIT

Anthony R. Bonaccio, Shelburne, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 30, 1986, Ser. No. 925,018
Int. Cl.[4] H03K *5/24*
U.S. Cl. 307—355 **5 Claims**

1. A multisignal comparator circuit comprising:
a pair of comparator stages, each of said stages comprising a plurality of like transistors,
the transistors of the first stage being of a type different from the transistors of the second stage,
each stage comprising a reference transistor having a reference voltage applied thereto and at least one receiving transistor having an input signal applied thereto,
the first stage being coupled to the second stage to control the current passing through the receiving transistor in the second stage,



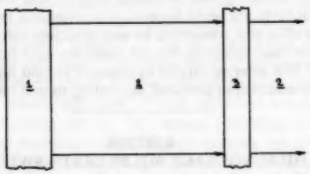
said first stage is provided with complementary outputs and said complementary outputs are coupled to an emitter coupled switch whose outputs are coupled to said second stage.

4,697,100

DEUTERATED L-ARGININE PHOSPHATE MONOHYDRATE

David Eimerl, Pleasanton, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 17, 1986, Ser. No. 819,654
Int. Cl.[4] H03F *7/00*; H01S *3/10*; G03C *1/00*
U.S. Cl. 307—427 **18 Claims**



17. An apparatus for frequency conversion of light, the apparatus comprising:
a laser for generating a laser beam; and
at least one crystal according to the formula:

$$(X_2N)_2CNX\,(CH_2)_3\,CH\,(NX_3)^+COO^-\cdot\,{}^{X}_{X_2O}{}_3PO_4.$$

where one or more of the X's represent deuterium replacing hydrogen and with any remaining X locations still being hydrogen, the at least one crystal being placed in the laser beam in an orientation for frequency conversion of the laser beam.

4,697,101

READ/WRITE CONTROL CIRCUIT

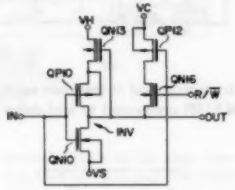
Hiroshi Iwahashi, Yokohama; Masamichi Asano, Tokyo; Masaki Momodomi, Yokohama; Hidenobu Minagawa, Kawasaki; Kazuto Suzuki, Kawasaki, and Akira Narita, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba; Toshiba Micro-Computer Engineering Corp., both of Kawasaki and Tosbac Computer System Co., Ltd., Tokyo, all of, Japan

Filed Aug. 29, 1984, Ser. No. 645,392

Claims priority, application Japan, Aug. 30, 1983, 58-158723; Sep. 8, 1983, 58-164112; Feb. 13, 1984, 59-24581; Apr. 23, 1984, 59-81289

Int. Cl.[4] H03K *19/096, 17/16;* **G06F** *7/38*

U.S. Cl. 307—452 **14 Claims**



1. A semiconductor integrated circuit comprising:

a voltage terminal connected to receive a high voltage,

an output terminal,

a first MOSFET coupled between said voltage terminal and said output terminal,

a gate voltage setting MOSFET having a gate coupled to said output terminal, a first end coupled to said voltage terminal and the other end coupled to the gate of said first MOSFET, to set the gate voltage of said first MOSFET in accordance with the voltage of said output terminal,

capacitive means, and

a clock pulse generator for supplying a clock pulse to the gate of said first MOSFET, through said capacitive means.

4,697,102

BIPOLAR LOGIC CIRCUIT HAVING TWO MULTI-EMITTER TRANSISTORS WITH AN EMITTER OF ONE CONNECTED TO THE COLLECTOR OF THE OTHER TO PREVENT SATURATION

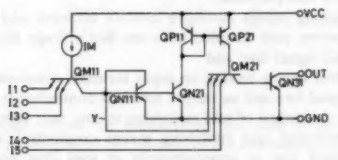
Takahiro Okabe, Nishitama; Makoto Hayashi; Katuhiro Morisuye, both of Kodaira; Tomoyuki Watanabe; Katsuyoshi Washio, both of Hachioji; Setsuo Ogura, Takasaki; Makoto Furihata, Sawa, and Shizuo Kondo, Takasaki, all of Japan, assignors to Hitachi Microcomputer Engineering Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed May 28, 1985, Ser. No. 737,872

Claims priority, application Japan, May 28, 1984, 59-106390; May 31, 1984, 59-162454

Int. Cl.[4] H03K *19/013, 19/082*

U.S. Cl. 307—454 **4 Claims**



1. A logic circuit comprising:

a first multi-emitter transistor having a first base conductivity type, with its emitters coupled to a group of first input lines, and with its base coupled to a bias means;

a current source having an input and an output, said input being coupled to the collector of said first multi-emitter transistor, wherein output current from said output is substantially equal or proportional to input current into said input;

a second multi-emitter transistor having the first base conductivity type, with its base coupled to said output of said current source; and

a first transistor having the first base conductivity type, which has one or more collectors, with its base coupled to the collector of said second multi-emitter transistor, with its emitter coupled to common line, and with one or more collectors coupled to one or more output lines,

wherein one of the emitters of said second multi-emitter transistor is coupled to the collector of said first multi-emitter transistor, and wherein the rest of the emitters of said second multi-emitter transistor are coupled to a group of second input lines.

4,697,103

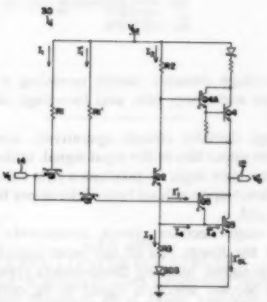
LOW POWER HIGH CURRENT SINKING TTL CIRCUIT

David A. Ferris, West Buxton, and Daniel J. DeSimone, Buxton, both of Me., assignors to Quadic Systems, Inc., South Portland, Me.

Filed Mar. 10, 1986, Ser. No. 838,519

Int. Cl.[4] H03K *19/088, 17/16, 19/00, 3/26*

U.S. Cl. 307—456 **14 Claims**



1. An improved TTL output buffer circuit for digital data transmission comprising:

a signal input for receiving binary data signals of high or low potential;

a signal output for delivering binary data signals of low or high potential in response to binary data signals at the input;

a pull-up transistor element for sourcing current from high potential (V_{cc}) to the signal output;

a first pull-down transistor element for sinking current from the signal output to low potential;

a phase splitter transistor element having an emitter coupled to the base of the first pull-down transistor element for controlling the conducting state of the first pull-down transistor element, said phase splitter transistor element having a collector coupled to the base of said pull-up transistor element;

first base drive means coupling the base of the phase splitter transistor element to the signal input;

a second pull-down transistor element having the collector coupled to the collector of the first pull-down transistor element at the signal output and the emitter coupled to drive the base of the first pull-down transistor element for square law enhancement and amplification of sinking current by the first pull-down transistor element;

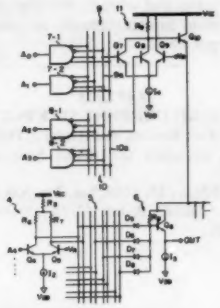
and second base drive means coupling the base of the second pull-down transistor element to the signal input for providing base drive independent from the first base drive means in response to binary data signals at the signal input.

4,697,104

TWO STAGE DECODER CIRCUIT USING THRESHOLD LOGIC TO DECODE HIGH-ORDER BITS AND DIODE-MATRIX LOGIC TO DECODE LOW-ORDER BITS

Yoshinori Okajima, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed May 24, 1985, Ser. No. 737,464
Claims priority, application Japan, May 31, 1984, 59-109500
Int. Cl.[4] H03K *19/086, 19/084*
U.S. Cl. 307—463 **6 Claims**



4. A two-stage decoder circuit receiving an input signal having upper and lower bits, said two-stage decoder circuit comprising:

a first-stage decoder circuit, operatively connected to receive the upper bits of the input signal, utilizing threshold-operation type logic to produce a first selection signal in dependence upon at least two of the upper bits of the input signal; and

a second-stage decoder circuit, operatively connected to receive the lower bits of the input signal and the first selection signal, utilizing diode-matrix type logic to produce a second selection signal to be output from said two-stage decoder circuit, in dependence upon the lower bits of the input signal and the first selection signal.

4,697,105

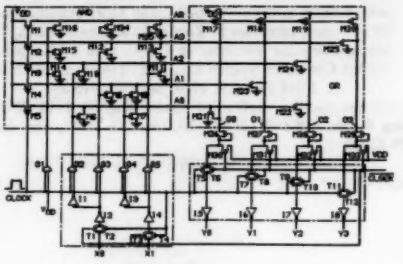
CMOS PROGRAMMABLE LOGIC ARRAY

Thomas H. Moy, Allentown, Pa., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 23, 1986, Ser. No. 888,796
Int. Cl.[4] H03K *19/177, 17/284*
U.S. Cl. 307—465 **3 Claims**

1. An integrated circuit comprising a programmable logic array having an AND plane and an OR plane, wherein said AND plane includes conductive AND logic lines (A0 . . . A3) and precharge transistors (M5 . . . M2) controlled by a clock for charging the AND logic lines to a high voltage level, and said OR plane includes conductive OR logic lines (O0 . . . O3) and load transistors (M17 . . . M20) for pulling the OR logic lines toward a high voltage level,

CHARACTERIZED in that said AND plane further comprises a conductive delay line (AR) that is directly connected to the control electrodes of said load transistors in the OR plane, and charged to a high voltage level by a precharge transistor (M1) when said clock is in a first state, and discharged to a low voltage level by a discharge transistor (M16) when said clock is in a second state, and still further comprises at least one capacitive load transistor (M14,M15) connected to the control electrode of said



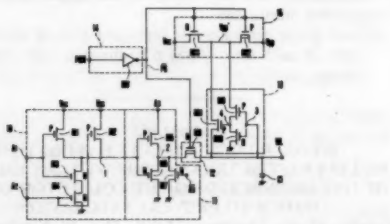
discharge transistor, and at least one capacitive load transistor (M34,M35) connected to said delay line.

4,697,106

PROGRAMMABLE MEMORY CIRCUIT

Takeshi Watanabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Division of Ser. No. 532,923, Sep. 16, 1983, Pat. No. 4,583,205. This application Oct. 16, 1985, Ser. No. 788,367
Claims priority, application Japan, Sep. 17, 1982, 57-161861
Int. Cl.[4] G11C *8/00;* **H03K** *19/094, 5/22;* **G01R** *19/145*
U.S. Cl. 307—463 **6 Claims**



1. A semiconductor circuit comprising:

a logic circuit having an output terminal and having at least one input terminal for receiving at least one input signal, said logic circuit selectively generating either one of first and second potentials at its output terminal in response to said at least one input signal;

a signal line;

connecting means for connecting said output terminal of said logic circuit to said signal line;

a voltage terminal receiving a third potential higher than said first potential;

switching means having a control terminal and having a current path coupled between said voltage terminal and said signal line; and

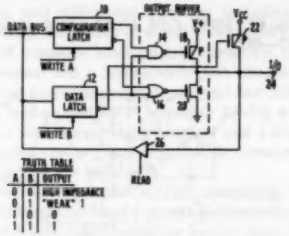
control means having an input terminal connected to said signal line and an output terminal connected to said control terminal of said switching means, said control means rendering said switching means conductive when said signal line is approximately at said first potential to thereby supply said third potential to said signal line and render said switching means non-conductive when said signal line is approximately at said second potential.

4,697,107

FOUR-STATE I/O CONTROL CIRCUIT

Ralph W. Haines, Sunnyvale, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jul. 24, 1986, Ser. No. 889,686
Int. Cl.[4] H03K *17/693*
U.S. Cl. 307—474 **9 Claims**



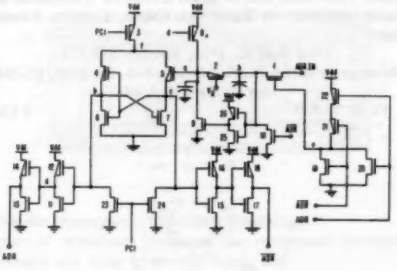
5. In an I/O control circuit of the type that receives only two inputs such that four sets of input conditions to the circuit are defined and wherein the circuit includes means responsive to a first set of input conditions to establish a low impedance path from the circuit output to a first supply voltage, means responsive to a second set of input conditions to establish a low impedance path from the output to a second supply voltage which is more negative than the first supply voltage and means responsive to a third set of input conditions to establish a high impedance path from the output to both the first supply voltage and the second supply voltage, the improvement comprising pull-up means connected to the output such that the fourth set of input conditions establishes a path from the output to the first supply voltage, the path having an impedance intermediate that of the low impedance path and the high impedance path.

4,697,108

COMPLEMENTARY INPUT CIRCUIT WITH NONLINEAR FRONT END AND PARTIALLY COUPLED LATCH

Barbara A. Chappell, Amawalk, and Stanley E. Schuster, Granite Springs, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed May 9, 1986, Ser. No. 861,166
Int. Cl.[4] H03K *19/096*
U.S. Cl. 307—475 **5 Claims**



1. An input circuit for transferring the state of an input external to an integrated circuit chip to the internal signal lines of the integrated circuit chip comprising:

a nonlinear input circuit having an input terminal for receiving an external input and providing an output to a first node only when the external input exceeds a reference voltage plus a threshold voltage, said nonlinear input circuit including first and second complementary conductivity transistor devices connected in series between said input terminal and said first node, each of said first and second transistor devices having a control input terminal, the control input terminal of said first transistor device being connected to a control node for turning said first transistor device off after voltage transfer is complete and the control input terminal of said second transistor device being connected to a reference voltage source; and

latch means including third and fourth complementary conductivity transistor devices connected in series between a common node and ground and fifth and sixth complementary conductivity transistor devices connected in series between said common node and ground, the common connections between said third and fourth transistor devices and between said fifth and sixth transistor devices being first and second output nodes, respectively, of said latch means, said first and second output nodes being connected to the internal signal lines of the integrated circuit chip, each of said third, fourth, fifth and sixth transistor devices having a control electrode, the control electrode of said third transistor device being connected to said second output node of said latch means which is the common connection between said first and sixth transistor devices, the control electrodes of said fifth and sixth transistor devices being connected to said first output node of said latch means which is the common connection between said third and fourth transistor devices, and the control electrode of said fourth transistor device being connected to said first node.

4,697,109

LEVEL CONVERTER CIRCUIT

Noriyuki Honma, Kokubunji; Goro Kitsukawa, Nishitama, and Makoto Suzuki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 5, 1985, Ser. No. 751,864
Claims priority, application Japan, Jul. 5, 1984, 139661
Int. Cl.[4] H03K *19/092, 19/086, 19/003, 17/10*
U.S. Cl. 307—475 **7 Claims**

3. A level converter circuit which coverts an input signal to output signals having predetermined first and second voltage levels, said level converter circuit comprising:

a first level-shift circuit fed with said input signal;

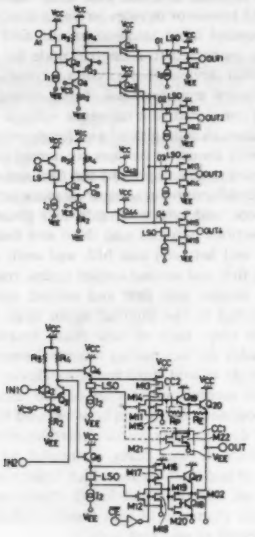
a current switch circuit fed with an output signal of said first level-shift circuit, said current switch circuit outputting a signal having a signal amplitude larger than the output signal amplitude of said first level-shift circuit;

a second level-shift circuit fed with the output signal of said current switch circuit for generating a first output with a small level-shift and a second output with a larger level-shift than said first output; and

a first CMOS circuit including a PMOS transistor having its gate fed with said first output, and an nMOS transistor having its gate fed with said second output,

wherein said current switch provides output levels to turn off said PMOS transistor and to turn on said nMOS transistor at its high level and to turn on said PMOS transistor and to turn off said nMOS transistor at its low level to provide said output signals having said predetermined first and second voltage levels, and further wherein said cur-

rent switch circuit includes a reference terminal fed with a reference voltage controlled in accordance with fluctuations of power supply voltage or junction temperatures of transistors in said level converter circuit.



4,697,110

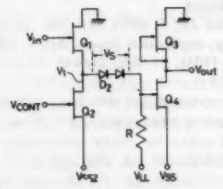
FLUCTUATION-FREE INPUT BUFFER

Noboru Masuda; Michio Asano; Takehisa Hayashi, all of Kokubunji; Hirotoshi Tanaka, Hachioji, and Akira Masaki, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 28, 1983, Ser. No. 555,618

Int. Cl.[4] H03K *17/14, 19/094*

U.S. Cl. 307—475 **14 Claims**



1. An input buffer comprising a source follower circuit having a logic threshold level which is subject to undesired fluctuations in logic threshold level which includes first and second FETs of an identical conductivity type connected in series, and in which a gate of said first FET is connected to a circuit input for receiving an input signal, and a FET inverter circuit, which receives an output of said source follower circuit derived from between said first and second FETs wherein the logic threshold level of said source follower circuit is controlled by a voltage which is produced by a means for producing a compensating voltage which varies in a manner opposite to the undesired fluctuations in logic threshold level, that is applied to a gate of said second FET in said source follower circuit to cancel said undesired fluctuations.

4,697,111

LOGIC BOATSTRAPPING CIRCUIT HAVING A FEEDFORWARD KICKER CIRCUIT

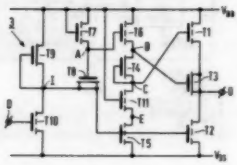
Adrianus T. Van Zanten; Hendrikus J. M. Veendrick; Leonardus C. M. G. Pfennings, and Wilhelmus C. H. Gubbels, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 7, 1985, Ser. No. 698,999

Claims priority, application Netherlands, Feb. 20, 1984, 8400523

Int. Cl.[4] H03K *4/58, 17/10, 17/04, 19/017*

U.S. Cl. 307—482 **4 Claims**



1. An integrated logic circuit comprising insulated gate field effect transistors, each of said transistors having a source, a gate and a drain electrode, said circuit having first and second inverting amplifiers each having an input and an output, the first amplifier comprising first and second transistors which are connected in series between a first and a second supply terminal and are controlled in phase opposition, a first capacitance, a junction between the first and the second transistors being coupled to the second inverting amplifier by said first capacitance, said gate electrode of the first transistor being connected to the output of the second amplifier, a third transistor, the gate electrode of the second transistor being connected to the gate electrode of the third transistor associated with the second amplifier and receiving an input signal, and a fourth transistor, characterized in that the second amplifier is connected by the fourth transistor to a first supply terminal, and a fifth transistor and a second capacitance, the gate electrode of the fourth transistor being connected by said fifth transistor, which is connected as a diode, to the first supply terminal and is also connected by said second capacitance to the gate electrodes of the second and third transistors, the first, second, third, fourth and fifth transistors being of the enhancement type.

4,697,112

CURRENT-MIRROR TYPE SENSE AMPLIFIER

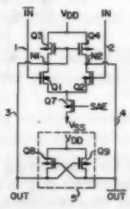
Takayuki Ohtani, Tokyo; Mitsuo Isobe, Yokohama; Akira Aono, Yokohama, and Nobuaki Urakawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 25, 1986, Ser. No. 878,372

Claims priority, application Japan, Feb. 20, 1986, 61-35478

Int. Cl.[4] H03F *3/45*

U.S. Cl. 307—530 **5 Claims**



1. A current-mirror type sense amplifier comprising:
first and second input terminals;

first and second output terminals;

a first power source node connected to a first power source potential;

a second power source node connected to a second power source potential;

a pull-up node connected to a pull-up potential;

a differential amplifier for amplifying an input signal between said first and second input terminals to create a potential difference between said first and second output terminals, said differential amplifier including first and second MOS transistors of a first conductivity type, said first MOS transistor having a gate connected to said first input terminal and a drain-source path coupled between said second power source node and said first output terminal, and said second MOS transistor having a gate connected to said second input terminal and a drain-source path coupled between said second power source node and said second output terminal;

a current-mirror type load circuit comprising third and fourth MOS transistors of a second conductivity type, said third and fourth MOS transistor having gates connected to each other and to said first output terminal, said third MOS transistor having a drain-source path coupled between said first power source node and said first output terminal, and said fourth MOS transistor having a drain-source path coupled between said first power source node and said second output terminal; and

pull-up circuit means for increasing the potential difference between said output terminals, said pull-up circuit means including fifth and sixth MOS transistors of said second conductivity type, said fifth MOS transistor having a gate connected to said second output terminal and a drain-source path coupled between said pull-up node and said first output terminal, and said sixth MOS transistor having a gate connected to said first output terminal and a drain-source path coupled between said pull-up node and said second output terminal.

4,697,113

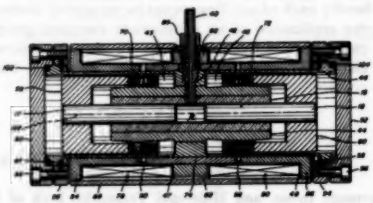
MAGNETICALLY BALANCED AND CENTERED ELECTROMAGNETIC MACHINE AND CRYOGENIC REFRIGERATOR EMPLOYING SAME

Niels O. Young, Eagle, Id., assignor to Helix Technology Corporation, Waltham, Mass.

Filed Aug. 1, 1985, Ser. No. 761,164

Int. Cl.⁴ H02K *33/00*

U.S. Cl. 310—15 **28 Claims**



1. An electromagnetic machine comprising:

a pair of armatures mounted for reciprocal movement toward and away from each other; and

a stator having parallel magnetic flux paths between the armatures and oriented relative to the armatures such that movement of an armature transfers flux between the flux paths and such transfer of flux with movement of one armature not balanced by movement of the other armature in an opposite direction causes balancing magnetic forces between the armatures such that they tend to move equally and oppositely.

4,697,114

PERMANENT-MAGNET ROTOR SHRINK-FIT ASSEMBLY

Yoichi Amemiya; Masatoyo Sogabe, and Kiyoshi Tagami, all of Hachioji, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

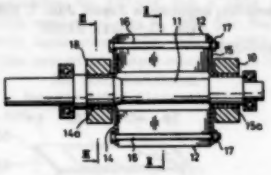
PCT No. PCT/JP86/00101, § 371 Date Oct. 27, 1986, § 102(e) Date Oct. 27, 1986, PCT Pub. No. WO86/05332, PCT Pub. Date Sep. 12, 1986

PCT Filed Feb. 28, 1986, Ser. No. 933,643

Claims priority, application Japan, Feb. 28, 1985, 60-37650

Int. Cl.⁴ H02K *15/02, 21/14*

U.S. Cl. 310—156 **4 Claims**



1. A permanent magnet rotor assembly comprising:

a rotor shaft;

a plurality of yokes arranged around the rotor shaft at circumferential intervals and extended along the axis of the rotor shaft;

permanent magnets extended along the axis of the rotor shaft and each held between two adjacent yokes;

a pair of end plates attached to axially opposite ends of the yokes, respectively, each of said end plates being formed of a non-magnetic material and being provided, in the central portion thereof, with a boss which is secured to the outer circumference of the rotor shaft by the compressive force of a fastening ring mounted thereon by thermal shrinkage insertion.

4,697,115

SURFACE ACOUSTIC WAVE DEVICE

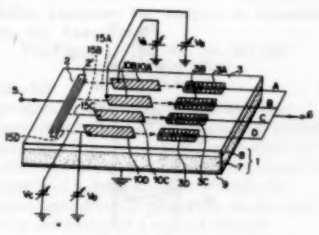
Syuichi Mitsutsuka, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Oct. 9, 1985, Ser. No. 785,938

Claims priority, application Japan, Oct. 15, 1984, 59-215952

Int. Cl.⁴ H01L *41/08*

U.S. Cl. 310—313 R **5 Claims**



1. A surface acoustic wave device, comprising:

a semiconductor substrate;

a piezoelectric film disposed on said semiconductor substrate;

an input transducer and an output transducer disposed at two locations on said piezoelectric film;

a plurality of metal electrodes disposed between said input transducer and said output transducer;

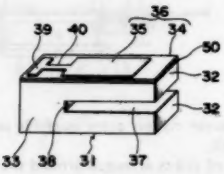
bias voltage applying means for applying a respective bias voltage to each of said metal electrodes; and

bias voltage regulating means for regulating said bias voltages;
wherein an insulating film is provided between said semiconductor substrate and said piezoelectric film; and
wherein a metal film is disposed between said metal electrodes and said output transducer on said insulating film.

4,697,116
PIEZOELECTRIC VIBRATOR

Takeshi Nakamura, Uji; Hiroshi Nishiyama, Muko, and Ikuo Matsumoto, Takatsuki, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jan. 6, 1983, Ser. No. 456,307
Claims priority, application Japan, Jan. 7, 1982, 57-1512
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—322 **1 Claim**

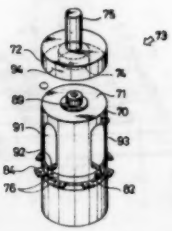


1. A piezoelectric vibrator, comprising:
a mechanical vibrating member made of elinvar;
an aluminum layer having first and second opposed surfaces, said first surface being located on one surface of said mechanical vibrating member;
a piezoelectric layer having first and second opposed surfaces, said first surface of said piezoelectric layer being located on said second surface of said aluminum layer; and
an electrode layer located on said second surface of said piezoelectric layer.

4,697,117
ROTARY ULTRASONIC MOTOR

Shoji Mishiro, Kanagawa, Japan, assignor to Taga Electric Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1986, Ser. No. 930,429
Claims priority, application Japan, Nov. 27, 1985, 60-266617; Dec. 24, 1985, 60-291732; Jan. 23, 1986, 61-12823
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 **5 Claims**

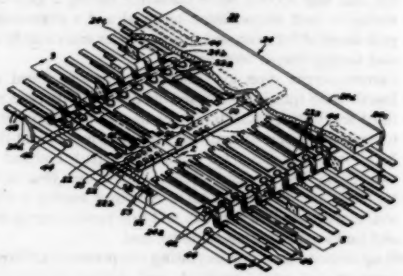


1. A rotary ultrasonic motor comprising an ultrasonic vibrator with an electrostrictive element which is polarized in the direction of its thickness and has a plurality of electrode pairs arrayed at equal intervals in the circumferential direction, said electrostrictive element being held and clamped between two metallic members in which grooves are formed with the exception of end regions thereof along division lines corresponding in number to said electrode pairs of said electrostrictive element, wherein an intermediate portion of said ultrasonic vibrator is anchored to a frame, and a rotor kept in pressed contact with the output end of said ultrasonic vibrator is rotatably attached to said frame, said rotor having an output shaft at the center of rotation thereof.

4,697,118
PIEZOELECTRIC SWITCH

John D. Harnden, Jr., Schenectady; William P. Kornrumpf, Albany; James E. Kohl, and Michael S. Adler, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 15, 1986, Ser. No. 896,792
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—331 **26 Claims**



1. A piezoelectric switch comprising:
a case including a first inner surface;
a piezoelectric bimorph element including at least two generally coplanar and oppositely extending fingers connected by a common spine;
means for mounting said element spine to said case with said fingers spaced from said first inner case surface;
means for applying a separate electrical potential to each of said element fingers for separately controlling their deflection in a direction generally perpenicular to the plane of said fingers;
at least one separate movable electrical contact disposed on each of said element fingers spaced from said spine and insulated from said electrical potential applying means; and
at least one separate stationary contact disposed on said inner case surface generally opposite each of said movable contacts;
whereby each of said fingers can be separately controlled by the application of an appropriate electrical potential to cause it to deflect and force its movable contact into electrical connection with the opposing stationary contact.

4,697,119
COLOR CATHODE RAY TUBE HAVING A NON-SPHERICAL CURVED MASK

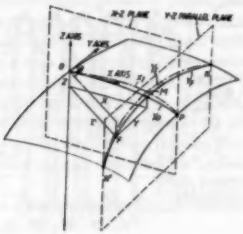
Masatsugu Inoue, and Hidetoshi Yamazaki, both of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 31, 1985, Ser. No. 815,023
Claims priority, application Japan, Jan. 11, 1985, 60-2040; Nov. 25, 1985, 60-262375
Int. Cl.[4] H01J *29/07*
U.S. Cl. 313—408 **7 Claims**

1. A color cathode ray tube comprising:
a substantially rectangular curved panel having an inner surface on which is formed a phosphor screen, said panel having a central axis normal to said screen at the center of said panel;
a shadow mask having a center and a non-spherical curved

surface and which is mounted via a substantially rectangular frame in a position such that the central axis of said panel passes through the center of the mask, said shadow mask having an effective area in which a plurality of apertures are formed to permit passage of electron beams through said apertures; and

said shadow mask having a major axis, a minor axis, opposed short edges and opposed long edges, said mask defining a three dimensional cartesian geometry in which the mask center is the origin, the major axis is the X axis, the minor axis is the Y axis, and an axis normal to the mask at the mask center is the Z axis, said mask having a first line of intersection formed between the opposed short edges by



the intersection of a plane containing the X and Z axes (X-Z plane) and the effective area of the mask, said mask having second lines of intersection formed by intersections of parallel planes that are parallel to the Y and Z axes (Y-Z parallel planes) and the effective area, said second lines of intersection having varying values of radii of curvature along the first line of intersection with minimum radii of curvature occuring between the center of the mask and the opposed short edges of the mask, said second lines of intersection terminating at the opposed long edges of the mask, said long edges of the mask each having a cross section which defines a substantially circular arc.

4,697,120

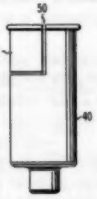
COLOR DISPLAY SYSTEM WITH ELECTROSTATIC CONVERGENCE MEANS

Roger C. Alig, Princeton Junction; Stanley Bloom, Bridgewater, and Eric F. Hockings, Princeton, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jun. 26, 1986, Ser. No. 878,788

Int. Cl.[4] H01J *29/51, 29/62*

U.S. Cl. 313—412 **7 Claims**



1. In a color display system including a cathode-ray tube having an electron gun assembly for generating and directing three electron beams, located at the corners of an equilateral triangle, along paths toward a screen of said tube, said gun assembly comprising three electron guns each including electrodes comprising a beam-forming region and electrodes for forming a main focusing lens, and said system including a non-converging yoke, the improvement comprising

the main focusing lens electrode of each electron gun closest to the beam-forming region including means for forming a separate electrostatic dipole field in the path of an associated electron beam and the dipole fields being oriented to cause the electron beams to converge at the screen for all angles of deflection.

4,697,121

LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP

Yasuo Kato, Zama; Tetsuo Ono, Kokubunji; Yoshio Watanabe, Tokyo; Seiichi Murayama, Kokubunji; Shigeo Mikoshiba, Tokyo, and Hiromitsu Matsuno, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

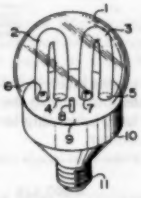
Continuation of Ser. No. 577,611, Feb. 6, 1984, Pat. No. 4,611,148. This application Sep. 8, 1986, Ser. No. 904,398

Claims priority, application Japan, Feb. 21, 1983, 58-26168

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[4] H01J *17/44, 61/54*

U.S. Cl. 313—595 **1 Claim**



1. A low-pressure mercury vapor discharge lamp comprising an outer bulb gas-tightly enclosing a space filled with a rare gas and mercury, an inner tube arrangement disposed within the outer bulb, the inner tube arrangement being provided with an electrode at each of its two closed ends and the inner space of the inner tube arrangement communicating with the space enclosed by the outer bulb through an opening, a starting probe disposed in the proximity of the opening and inside of the outer bulb for establishing a subsidiary discharge path to each of the electrodes along a main discharge path which is formed between the electrodes, an operating circuit connected to the electrodes, and a starting probe circuit connected to the starting probe for applying a high voltage to the starting probe at the time of starting of the lamp.

4,697,122

SLOW ACTING PHOTO LAMP CONTROL

Roy D. Hoffer, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Aug. 1, 1986, Ser. No. 891,610

Int. Cl.[4] H05B *37/02*

U.S. Cl. 315—158 **8 Claims**

1. A light sensitive lamp controller comprising:

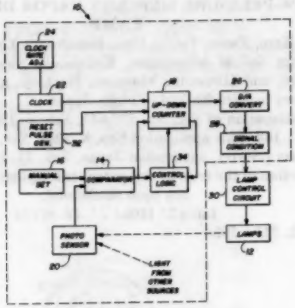
(a) a photosensor located to be affected by available light, including light from lamps being controlled by the lamp controller, and generating an electrical signal related to the quantity of light to which it is subjected;

(b) a manual setting means generating an electrical voltage related to the setting of a manual control;

(c) a signal comparator electrically connected to the photosensor and to the manual setting means, receiving electrical signals from both, and generating an output of a command signal which varys with the relationship between the signals received from the photosensor and the manual setting means;

(d) an electronic up-down counter electronically connected to the output of the signal comparator, receiving the command signal from the signal comparator, counting up or down in its register depending upon the command signal received, and generating an output signal varying with the level of the count on its register;

(e) a clock means electrically connected to the up-down counter and generating and feeding to the up-down counter a signal which repeats at a frequency determined by the clock means, the repeating signal acting upon the up-down counter to determine the rate at which the up-down counter changes the level of its count; and



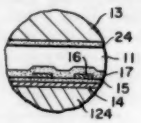
(f) lamp control means receiving electrical signals from the up-down counter and varying the electrical power applied to at least one lamp according to the level of the count of the up-down counter.

4,697,123

GAS DISCHARGE PANEL

Tsutae Shinoda, Akashi; Yoshinori Miyashita, Himeji; Yoshimi Sugimoto, Akashi; Hideo Sei, Kobe, and Shizuo Andoh, Akashi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 9, 1981, Ser. No. 319,404
Claims priority, application Japan, Nov. 19, 1980, 55-163712
Int. Cl.[4] G09G *3/10*
U.S. Cl. 315—169.4 **13 Claims**



1. A monolithic gas discharge panel, comprising:
a plurality of electrode pairs for receiving a specified voltage and generating surface discharge;
a plurality of electrode supporting substrates each having side edge surfaces and a respective pair of said plurality of electrode pairs arranged on one side thereof in a specified pattern, said supporting substrates being combined such that the side edge surfaces of adjacent ones of said supporting substrates are arligned face-to-face to form a combination substrate with corresponding electrodes on adjacent supporting substrates being electrically connected;
a single cover substrate covering and arranged facing said supporting substrates with specificed gap therebetween to define a space for gas discharge between them.

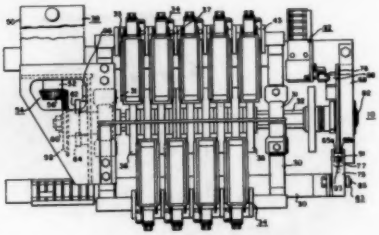
4,697,124

INTEGRAL SERIES PARALLEL AND POWER BRAKE CONTROLLER FOR A TRANSIT VEHICLE

William E. Schmitz, Wilkinsburg Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 18, 1986, Ser. No. 887,293
Int. Cl.[4] H02P *7/67*
U.S. Cl. 318—63 **13 Claims**

1. An integral series parallel changeover and power dynamic brake controller apparatus for a transit vehicle, said vehicle including a plurality of wheels, electrical motors for driving said wheels, said electrical motors each having armature means and field means, power source means for providing power to said electrical motors, said controller apparatus comprising:
(a) a frame means;
(b) a single cam shaft carried by said frame means;
(c) switching means for switching said electrical motors from a parallel circuit arrangement to a series circuit arrangement as desired and for switching electrically said field means and said armature means of said electrical motors as desired to effect dynamic braking;
(d) a plurality of cams, said cams mounted on said cam shaft



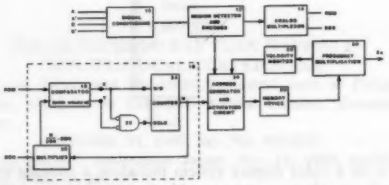
to engage said switching means at predetermined intervals;
(e) control motor means for rotating said cam shaft in a controlled manner;
(f) cam shaft stop means for maintaining the rotation of said single cam shaft between a predetermined starting point and a final point;
(g) cam shaft return spring means for rotating said cam shaft back to said starting point in case of loss of power to said control motor means;
(h) cam shaft return spring latch means for preventing said spring means from opposing said control motor means during normal operation.

4,697,125

METHOD AND APPARATUS FOR DETERMINING SHAFT POSITION AND FOR PROVIDING COMMUTATION SIGNALS

Jerry K. Goff, Doylestown, and Gary E. Chizever, Abington, both of Pa., assignors to Performance Controls, Inc., Horsham, Pa.

Filed Mar. 24, 1986, Ser. No. 843,218
Int. Cl.[4] H02P *6/02*
U.S. Cl. 318—254 **39 Claims**



15. Apparatus for determining the angular displacement of a rotating shaft, comprising:
(a) digital memory means having a plurality of addresses, the digital memory means being programmed with at least one sequence of binary digits, the sequence of binary digits defining a predetermined stream of pulses, and
(b) means for activating a specific sequence of addresses in

the memory means to produce an output signal, wherein the activating means is operatively connected to a means for sensing the angular position of the shaft,

wherein the output signal is a stream of pulses corresponding to the programmed sequence in the memory means, the frequency of which stream is proportional to the angular velocity of the shaft, the output signal being taken directly from the memory means.

19. Apparatus for providing commutation control for a brushless motor, the motor having a shaft, comprising:

(a) digital memory means having a plurality of addresses, the digital memory means being programmed with at least one sequence of binary digits, the sequence of binary digits defining a predetermined stream of pulses, and

(b) means for activating a specific sequence of addresses in the memory means to produce an output signal, wherein the activating means is operatively connected to a means for sensing the angular position of the shaft,

wherein the output signal is a stream of pulses, the pulses comprising commutation signals suitable for control of the motor, and wherein the memory means also comprises means for advancing and retarding the commutation signals.

22. A method of determining the angular displacement of a rotating shaft, comprising the steps of:

(a) sensing the instantaneous orientation of the shaft, and computing a digital signal according to the sensed instantaneous orientation of the shaft,

(b) activating an address, corresponding to said digital signal, in a digital memory means, the memory means being preprogrammed with at least one sequence of binary digits, the binary digits defining at least one stream of pulses, and

(c) repeating the computing and activating steps, while counting the pulses in the stream and while converting the number of pulses into a value of angular displacement.

28. A method of simultaneously determing the angular displacement of a rotating shaft, and of commutating a motor for driving the shaft, comprising the steps of:

(a) sensing the instantaneous orientation of the shaft, and computing a digital signal according to the sensed instantaneous orientation of the shaft, and

(b) activating an address, corresponding to said digital signal, in a digital memory means, the memory means being pre-programmed with at least two sequences of binary digits, the binary digits defining at least two streams of pulses, wherein there is at least one velocity pulse stream having a frequency proportional to the rotational velocity of the shaft, and wherein there is at least one commutation pulse stream comprising a commutation signal for the motor, and

(c) repeating the computing and activating steps, while counting the pulses in the velocity pulse stream and converting the number of pulses into a value of angular displacement, and while applying the commutation pulse stream to control the motor.

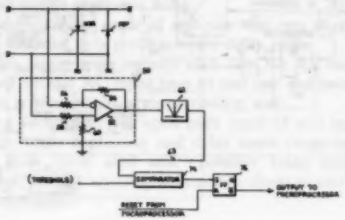
30. A digital memory circuit for generating a stream of pulses corresponding to the rotation of a shaft, the memory circuit comprising a plurality of addresses, each address containing at least one binary digit, the binary digits defining the stream of pulses, the circuit being divided into a plurality of regions, the regions corresponding to angular regions in which the shaft is instantaneously located, the binary digits in alternate regions being programmed for activation in opposite directions, and wherein the binary digits are arranged in a nonlinear form to compensate for nonlinear movement of the shaft, wherein activation of a sequence of addresses in the memory circuit causes the circuit to produce a stream of pulses indicative of the motion of the shaft.

4,697,126

CONTROL METHOD FOR DIRECT CURRENT MOTOR

W. Bruce Jarvinen, and Stephen J. Lukas, both of Roanoke, Va., assignors to General Electric Company, Salem, Va.

Filed Mar. 19, 1982, Ser. No. 359,962
Int. Cl.[4] G05B 5/00
U.S. Cl. 318—331 **8 Claims**



1. In a direct current motor drive system of the type in which motor current is supplied to the motor from a three-phase alternating current source by way of first and second rectifying bridges controlled to supply said current in an alternating fashion to the motor in low torque situations, an improved method of controlling said bridges comprising the steps:

(a) providing a command signal indicative of a desired level of motor operation;

(b) providing a feedback signal proportional to motor terminal voltage;

(c) combining said command signal and said feedback signal to derive a combined signal;

(d) integrating said combined signal to provide a control signal;

(e) determining if the motor current is discontinuous; and,

(f) determining, when said motor current is discontinuous, whether a first of said bridges may be rendered conductive next after a second of said bridges was rendered conductive comprising the steps of,

(1) retaining an indicium of said second bridge which was last rendered conductive,

(2) determining the difference in valve in said control signal at the approximate time that said second bridge was last rendered conductive and a time subsequent thereto; and,

(3) evaluating on the basis of said retained indicium and the difference in value in said control signal, the permissibility of next rendering said first bridge conductive; and,

(g) permitting rendering said first bridge conductive only if determined permissible.

4,697,127

ADAPTIVE CONTROL TECHNIQUE FOR A DYNAMIC SYSTEM

Michael C. Stich; John B. Resman; Hjalmar H. Ottesen, and Todd B. Anderson, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 9, 1986, Ser. No. 871,949
Int. Cl.[4] G05B 13/00; G11B 21/08
U.S. Cl. 318—561 **12 Claims**

1. A rotating storage device having data stored thereon in parallel tracks comprising

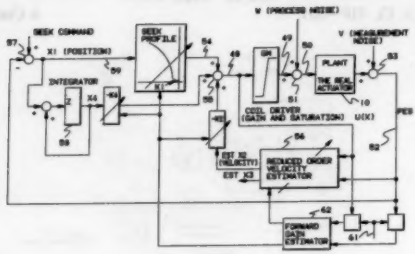
transducer means;

an actuator assembly which includes a voice coil and is connected to said transducer means for moving said transducer means from one track location to another track location;

controller means, having an on-line adjustable gain characteristic, for controlling movement of said actuator assembly;

estimator means, having an on-line adjustable gain characteristic, for estimating actuator velocity and bias;

means for estimating the forward gain of said actuator assembly from position and coil current measurements;



means for comparing said estimated value of forward gain with a nominal value of forward gain to generate an error signal; and

means to adjust said controller means and estimator means gain characteristics as a function of said error signal.

4,697,128

CONTROL APPARATUS FOR A ROTOR SUPPORTED BY AN ELECTROMAGNETIC BEARING

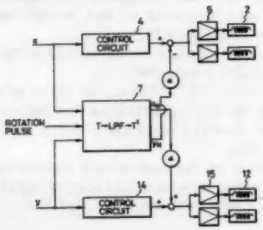
Osami Matsushita; Michiyuki Takagi; Mitsuho Yoneyama, and Toyomi Sugaya, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 8, 1986, Ser. No. 861,002

Claims priority, application Japan, May 13, 1985, 60-99564

Int. Cl.[4] G05B *1/02*

U.S. Cl. 318—607 **4 Claims**



1. A control apparatus for a rotor supported by an electromagnetic bearing, comprising:

an X-direction servo circuit including an X-directional displacement detector which detects an X-axial deviation of the rotor from a preset radial position, and a control circuit which generates a signal for controlling the X-axial position of the rotor so as to be held at the preset radial position, on the basis of an X-directional displacement signal output from said X-directional displacement detector,

a Y-direction servo circuit including a Y-directional displacement detector which detects a Y-axial deviation of the rotor from a preset radial position, and a control circuit which generates a signal for controlling the Y-axial position of the rotor so as to be held at the preset radial position, on the basis of a Y-directional displacement signal output from said Y-directional displacement detector,

a rotational frequency-synchronized tracking filter whose center frequency is a frequency corresponding to a rotational speed of the rotor,

means for applying the X-directional displacement signal to said filter as an input signal and to additively supply said Y-direction servo circuit with an X-directional output signal delivered from said filter, and

means for applying the Y-directional displacement signal to said filter as an input signal and to subtractively supply said X-direction servo circuit with a Y-directional output signal delivered from said filter.

4,697,129

STEPPING MOTOR DRIVE SYSTEM AND METHOD CAPABLE OF STOPPING THE ROTOR IN A REQUIRED ANGULAR POSITION

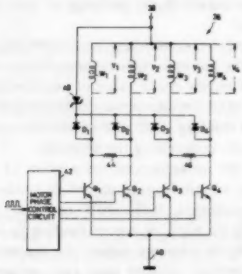
Katsuya Enami, Tachikawa; Hiroshi Tsuyuguchi, and Takahiro Sakaguchi, both of Tokyo, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Feb. 13, 1986, Ser. No. 829,425

Claims priority, application Japan, Feb. 15, 1985, 60-27915; Feb. 15, 1985, 60-27916

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **8 Claims**



1. A drive system for a stepping motor of the type having a rotor and at least one set of different phase stator windings on respective stator poles, comprising:

(a) a supply terminal connected to the stator windings each at a first extremity thereof;

(b) a plurality of switching elements each connected between a second extremity of one of the stator windings and ground;

(c) a motor phase control circuit for making on/off control of the switching elements so as to cause sequential excitation of the stator windings with a current of a first predetermined magnitude from the supply terminal in order to cause the rotation of the rotor, at least one of the stator windings being so excited at a time; and

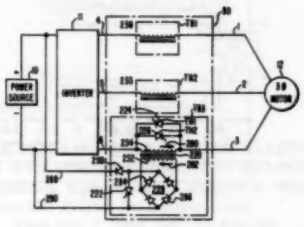
(d) rotor displacement means for causing, during the excitation of one of the stator windings under the control of the motor phase control circuit, at least one other of the stator windings to be excited with a current of a second predetermined magnitude less than the first predetermined magnitude;

(e) whereby when the sequential excitation of the stator windings is terminated, the rotor stops displaced to a predetermined degree in a predetermined direction from a position of exact alignment with the stator poles.

4,697,130
INDUCTION MOTOR REGENERATIVE BRAKE CONTROL APPARATUS AND METHOD

Habib Dadpey, Atlanta, Ga.; Paul J. Merlino, West Newton, Pa., and David J. Shero, South Park Township, Allegheny County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 696,938, Jan. 31, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 946,159
Int. Cl.[4] H02P 3/18
U.S. Cl. 318—760 **16 Claims**



1. In brake control apparatus for an induction motor energized with a first voltage having a known phase relationship and provided by an inverter coupled with a power source, said control apparatus being responsive to a brake request signal, the combination of

a first winding connected between the motor and the inverter,

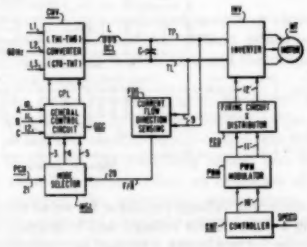
a second winding coupled with the first winding and connected with the power source for providing a second voltage for additionally energizing the motor, and

stabilizing switch means connected with the second winding and responsive to the brake request signal and the first voltage for controlling the time occurrence of the second voltage to centrally coincide with said known phase relationship of the first voltage in response to the brake request signal being provided so that the total braking torque energization of the motor is increased for an operating motor speed range by stably superimposing the first and second voltage energization of the motor.

4,697,131
VOLTAGE SOURCE INVERTER AND VARIABLE FREQUENCY, CONSTANT VOLTAGE AC MOTOR DRIVE EMBODYING THE SAME

Colin D. Schauder, and Theodore M. Heinrich, both of Murrysville Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 11, 1985, Ser. No. 807,569
Int. Cl.[4] H02P 3/20
U.S. Cl. 318—762 **9 Claims**



1. A method of pre-charging from three-phase AC input lines the DC-link capacitor of a constant voltage voltage-source inverter including: DC terminals connected to the input of the inverter; a DC-link capacitor across said DC terminals; a bridge of thyristors connected between respective one of said AC input lines and respective ones of said DC-link terminals; comprising the steps of:

firing one of said thyristors which is associated with one of said DC terminals and firing two of said thyristors which are associated with the other of said DC terminals in normal bridge sequential firing;

the operative firing angle of said one and two thyristors being retarded by a predetermined delay angle;

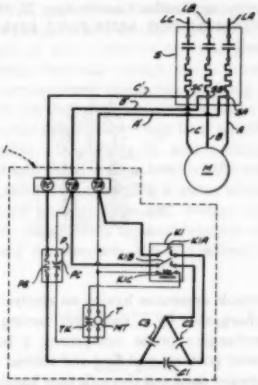
said delay angle being initially such that the AC voltage applied by said AC input lines to said one and two thyristors is substantially at zero-crossing; and

repeating such firing step upon each cycle of said applied voltage while decreasing said delay angle progressively with each cycle until said operative firing angle is reached, thereby applying maximum voltage to said DC-link capacitor.

4,697,132
REDUCTION OF VOLTAGE DROP IN POWER DISTRIBUTION SYSTEMS AND OF LOSS OF MOTOR TORQUE

Leroy B. Ronk, and Claude M. Hertz, both of Nokomis, Ill., assignors to Ronk Electrical Industries, Inc., Nokomis, Ill.

Filed Jul. 15, 1981, Ser. No. 283,636
Int. Cl.[4] H02P 1/26
U.S. Cl. 318—795 **2 Claims**



1. Apparatus for reducing the voltage drop in an electrical power distribution system during the starting of a multi-phase induction motor having stator windings supplied therefrom and for decreasing the loss in starting torque of the motor comprising:

a capacitor for direct connection across each stator phase winding of said motor;

switching means for connecting and disconnecting the capacitors from the respective stator windings; and

means for controlling the switching means to simultaneously disconnect the capacitors from the respective stator windings when the motor has substantially reached its running speed, the capacitors having a capacitance which is substantially independent of any capacitance employed to effect power factor correction during running operation and which exceeds that required to raise the no-load power factor of the motor to unity at running speed but is less than that which will correct the power factor of the motor to unity under locked rotor conditions;

said capacitors being electrolytic-type capacitors having a

capacitance which will reduce the motor starting current by at least approximately 30%;

said switching means including normally open contacts in a circuit interconnecting the capacitors across respective stator windings;

said control means including a coil shunt-connected across a stator winding of the motor and which when energized closes said contacts thereby shunt-connecting the capacitors across the respective stator windings and which when deenergized effects opening of the contacts to maintain the capacitors disconnected during operation of the motor at running speed wherein the control means further includes a timer connected in a circuit with the coil for deenergizing said coil and disconnecting the capacitors from across said stator windings after a predetermined time interval which substantially corresponds to that time required to bring said motor up to running speed; and

protective means responsive to both the magnitude of current flow through the capacitors and the period of time said current flows for disconnecting said capacitors from said stator windings when the product of period of time said current flows and the square of the current exceeds a preselected level.

4,697,133

RECHARGEABLE BATTERY POWERED TOY

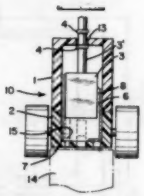
Grigorios Pergandis, 45, Agoniston Stratopedou Haidariou Street, Haidari, Attica, Greece

Filed May 20, 1986, Ser. No. 865,047

Claims priority, application Greece, Aug. 23, 1985, 85.2151/A

Int. Cl.[4] H02J *7/00;* **A63H** *29/22;* **F21V** *23/04*

U.S. Cl. 320—2 **5 Claims**



1. A toy vehicle apparatus having an electric power source which is rechargeable by a recharger having an upwardly projecting recharging probe comprising a housing having upper and lower portions and first and second ends, first and second axle means disposed through said housing and spaced toward said first and second ends respectively, motor means drivingly connected to one of said first or second axle means, said motor means having opposite electrical poles, a rechargeable battery, casing means slideably disposed within said housing and having an arm portion, a first opening in said housing, said arm portion of said casing means extending outwardly of said first opening in said housing, said rechargeable battery being movably carried by said casing means so as to be linearly movable between first and second positions within said housing, a second opening in said housing, said second opening being generally located opposite to said first opening, a first electrical contact means disposed between one of said poles of said motor and said first position of said battery, second electrical contact means extending between the other of said poles of said motor and communicating with both said first and said second positions of said battery, said motor means being electrically connected to said rechargeable battery when said rechargeable battery is in said first position and said rechargeable battery being moved out of electrical contact with said motor means when said rechargeable battery is in said second position.

4,697,134

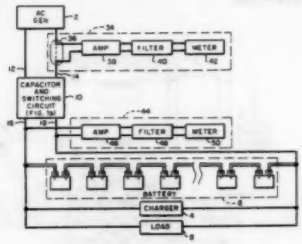
APPARATUS AND METHOD FOR MEASURING BATTERY CONDITION

Merlin E. Burkum, Elmhurst, and Charles M. Gabriel, Lombard, both of Ill., assignors to Commonwealth Edison Company, Chicago, Ill.

Filed Jul. 31, 1986, Ser. No. 892,793

Int. Cl.[4] G01N *27/46;* **H02J** *7/00*

U.S. Cl. 320—48 **47 Claims**



1. A battery monitor comprising:

a. an AC signal generator adapted to generate an AC signal at a selected frequency;

b. means for applying the AC signal across a first pair of contacts of a battery;

c. means for determining first and second Ohms-law-related parameters indicative of impedance across a second pair of contacts of the battery, said determining means comprising:

first means for supplying a first input signal indicative of the first Ohms-law-related parameter;

first filter means coupled to the first supplying means for passing components of the first input signal at the selected frequency and for attenuating at least components of the first input signal in a first attenuation frequency range greater than the selected frequency, said filter means operating to generate a first filtered output signal; and

first means for measuring said first filtered output signal to determine said first Ohms-law-related parameter.

4,697,135

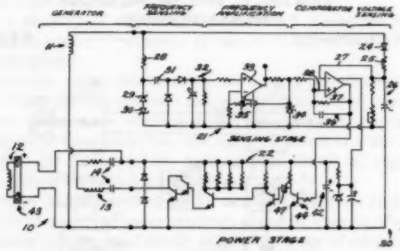
ELECTRONIC VOLTAGE REGULATOR

George M. Brandon, Charlotte, N.C., assignor to Textron, Inc., Providence, R.I.

Filed Jun. 24, 1986, Ser. No. 877,961

Int. Cl.[4] H02P *9/00*

U.S. Cl. 322—24 **19 Claims**



1. An electronic voltage regulator for an ac electric generator having a field, output voltage, and frequency, comprising:

first means for producing a filtered dc representation of the output voltage of the generator;

second means for producing a small dc voltage which is proportional to the frequency of the generator;

third means for comparing the small dc voltages produced by said first and second means; and

fourth means for using the comparison of said third means to control the generator field and thereby regulate the output voltage of the generator;

said regulator including a quad winding for the generator, said generator field being powered by said quad winding, wherein said fourth means controls the supply of emf from the quad winding to the field.

4,697,136

INVERTER SYSTEM FOR INPUTTING ALTERNATING CURRENT AND DIRECT CURRENT IN COMBINATION

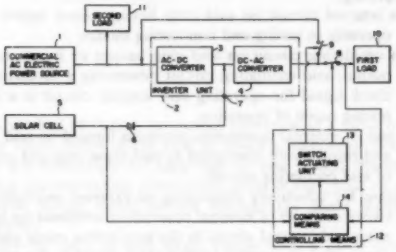
Fumihiko Ishikawa, Kagawa, Japan, assignor to Shikoku Denryoku Kabushiki Kaisha, Takamatsu, Japan

Filed Dec. 1, 1986, Ser. No. 936,596

Claims priority, application Japan, Dec. 2, 1985, 60-185758

Int. Cl.[4] G05F *1/00*

U.S. Cl. 323—267 **4 Claims**



1. An inverter system for inputting an alternating current and a direct current in combication, which comprises:

an AC-DC converter adapted to receive an DC electric power from an AC electric power source and to convert said AC electric power to a DC electiric power;

a DC-AC converter adapted to receive the DC electric power converted by said AC-DC converter and a DC electric power from a DC electric power source and to convert said DC electric powers thus received to an AC electric power;

a first switching means adapted to open or close an electric circuit between an output side of said DC-AC converter and a first load;

a second switching means adapted to open or close an electric circuit between said AC electric power source to which a second load is connected and the output side of said DC-AC converter; and

a controlling means constituted such that when a electric power consumption of the first load is larger than an output of the DC electric power source, the controlling means closes the first switching means and opens the second switching means; when an operation of the first load is stopped, the controlling means opens the first switching means and closes the second switching means; and when the electric power comsuption of the first load is smaller than the output of the DC electric power source, the controlling means closes both of the first and second switching means.

4,697,137

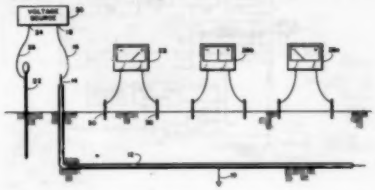
METHOD OF NONDESTRUCTIVELY ESTABLISHING AN EARTH GRADIENT FOR CABLE FAULT LOCATING

Merrill Haddon, Tigard, and Clifford H. Moulton, Portland, both of Oreg., assignors to Acqua-Tronics, Inc., Milwaukie, Oreg.

Filed Jan. 24, 1986, Ser. No. 822,126

Int. Cl.[4] G01R *31/10*

U.S. Cl. 324—512 **6 Claims**



1. A method of locating a fault in an insulated electrical conductor buried in earth by establishing a voltage graident through said earth emanating from said fault and thereafter sensing the direction of said gradient to locate said fault, such method including establishing said gradient by electrically isolated said conductor at respective ends located on each side of said fault, embedding a ground rod in said earth, electrically connecting a voltage source, having a maximum voltage level capable of establishing a voltage graident from said fualt to said ground rod despite any existence of an aluminum hydroxide or copper oxide coating on said conductor at said fault, between one of said ends of said conductor and said ground rod, and applying a voltage from said voltage source to said conductor, wherein the improvement comprises applying said voltage initially to said conductor at an initial voltage level significantly less than the maximum voltage level which said voltage source is capable of applying to said conductor, sensing whether or not said initial voltage level is sufficient to establish said voltage gradient by observing a meter responsive to the flow of electrical current from said voltage source to said ground rod and, after sensing the establishment of said voltage gradient, sensing the direction of said gradient to locate said fualt.

4,697,138

LOGIC ANALYZER HAVING A PLURALITY OF SAMPLING CHANNELS

Mitsuhiro Morishita, and Masayasu Sugimori, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan

Filed Jun. 18, 1986, Ser. No. 875,817

Claims priority, application Japan, Jun. 20, 1985, 60-134711

Int. Cl.[4] G01R *15/00, 31/28*

U.S. Cl. 324—73 R **2 Claims**

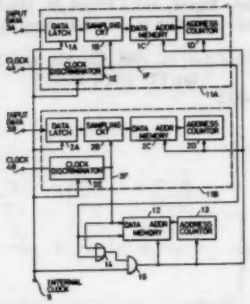
1. A logic analyzer including a plurality of sampling channels operative with different clock signals, comprising:

(a) a clock discriminating circuit disposed in each of said sampling channels and having inputs supplied with the clock signal of the associated sampling channel and an internal clock signal, said discriminating circuit producing an output signal in synchronism with said internal clock signal to thereby cause input data to be stored in the associated sampling channel;

(b) a memory having inputs applied with the outut signals of said clock discriminating circuits, respectively, for storing sequence in time in which said input data are sampled in said plurality of the sampling channels; and

(c) an address counter for updating the address of said mem-

ory in response to the outputs of said clock discriminating circuits.



wherein upon every input of said clock signal to said sampling channels, the states of the output signals of said clock discriminating circuits are stored in said memory.

4,697,139

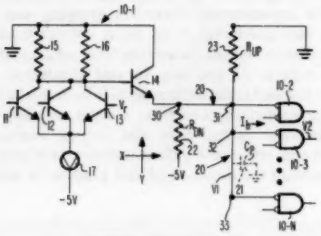
LOGIC CIRCUIT HAVING TESTABILITY FOR DEFECTIVE VIA CONTACTS

Laszlo V. Gal, Poway, Calif., assignor to Unisys Corporation, Detroit, Mich.

Continuation of Ser. No. 705,192, Feb. 25, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 11,368

Int. Cl.[4] G01R *31/28*

U.S. Cl. 324—73 R **11 Claims**



1. An integrated circuit having improved testability for defective via contacts, comprising:

a plurality of N logic gages which are in a semiconductor chip;

one of said gates having an output terminal which is connected by a conductor in said chip to respective input terminals on the remaining N−1 logic gates;

said one logic gate having ON and OFF states which respectively couple and decouple at 1 voltage level to said conductor;

a first resistor means, having a resistance R1, which couples said conductor through a first via contact, in the absence of a defect therein, to a 0 voltage bus;

said remaining N−1 logic gates being constructed such that they each drain a current I_b from said conductor through their respective input terminal; and

a second resistor means, having a resistance R2, which couples said conductor through a second via contact, in the absence of a defect therein, to another voltage bus;

said resistance R2 being selected to (a) carry a current of magnitude $I_b(N-1)$ from said another volage bus to said conductor under the condition where said first via is open due to a defect and said one logic gate is OFF, (b) produce a voltage drop when said current of magnitude $I_b(N-1)$ is flowing such that the voltage coupled to said conductor is closer to said 1 voltage than to said 0 voltage, and (c) be substantially larger than said resistance R1.

4,697,140

SEMICONDUCTOR INTEGRATED CIRCUIT HAVING A TEST CIRCUIT FOR TESTING AN INTERNAL CIRCUIT

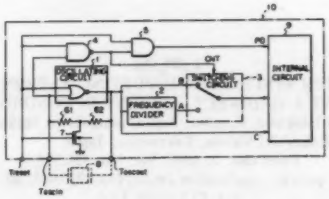
Tadahiro Saito, Kawasaki, and Kunihiko Gotoh, Kunitachi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 11, 1986, Ser. No. 828,188

Claims priority, application Japan, Feb. 20, 1985, 60-030190

Int. Cl.[4] G01R *31/28*

U.S. Cl. 324—73 R **6 Claims**



1. A semiconductor integrated circuit formed on a chip, comprising:

an internal circuit on said chip having plural inputs and operable in testing and non-testing modes;

an oscillating circuit on said chip having an input and an output, said oscillating circuit generating a fundamental clock signal for operating said internal circuit in a non-testing mode of operation;

a pair of external connection terminals formed on said chip and respectively connected to said input and said output of said oscillating circuit;

means for selectively connecting an external oscillator between said pair of external connection terminals for operating said internal circuit in the non-testing mode and for connecting an external testing clock signal to the respective one of said pair of terminals connected to said output of said oscillating circuit for operating said internal circuit in the testing mode;

a frequency divider on said chip having an input connected to said output of said oscillating circuit and an output and providing a divided, fundamental clock frequency at said output thereof;

an external connection, reset terminal on said chip; and

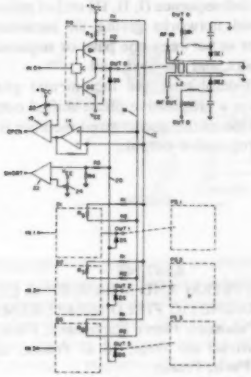
switching means on said chip connected to said external reset terminal and to the respective said terminal connected to said input of said oscillating circuit and responsive to a predetermined level of each of respective control signals selectively applied to said external connection reset terminal and said external connection terminal connected to said input of said oscillating circuit, for producing the testing mode of operation of said internal circuit and for rendering said oscillating circuit inoperative in the testing mode, said switching means further comprising a switching circuit having a first input connected to said output of said frequency divider and a second input connected to said output of said oscillating circuit, and an output connected to a corresponding input to said internal circuit, said switching circuit selectively connecting said first input thereof to said output thereof for supplying the divided fundamental clock signal from said frequency divider to said internal circuit in the non-testing mode, and said second input thereof to said output thereof for supplying the selectively applied external clock signal to said internal circuit in the testing mode of operation.

4,697,141

TESTING OF RF DIODE PHASE SHIFTERS

Paul H. Feldman, Center Moriches, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed Jul. 31, 1986, Ser. No. 891,012
Int. Cl.[4] G01R 31/02; H01Q 3/30
U.S. Cl. 324—158 R 8 Claims



1. A method of testing for proper operation of a radio frequency phase shifter of the kind in which a number of diode means are selectively forward and reverse biased thereby effecting corresponding incremental shifts in the phase of an RF wave energy signal passing through the phase shifter, comprising:

(a) driving each of said diode means with a drive stage which is energized by applying a supply voltage to the drive stage through a series resistance element thereby causing a voltage to be developed across the resistance element which is proportional to current supplied to the diode means when the drive stage is turned on and the diode means is forward biased;

(b) monitoring the voltage developed across each said series resistance element;

(c) establishing a normal forward bias current which is drawn by each of the diode means when driven by its drive stage and determining a corresponding first normal voltage which develops across the series resistance element of the drive stage when turned on;

(d) setting a first reference voltage corresponding to said first normal voltage,

(e) selecting one of the diode means for testing of an open circuit condition;

(f) turning on the drive stage with which the selected diode means is associated while turning off the drive stages of all remaining diode means of the phase shifter;

(g) testing for the existence of an open circuit condition for the selected diode means by comparing the voltage monitored in its drive stage with said first reference voltage;

(h) selecting another one of the diode means of the phase shifter for testing of an open circuit condition,

(i) turning on the drive stage with which the other selected diode means is associated while turning off all remaining drive stages; and

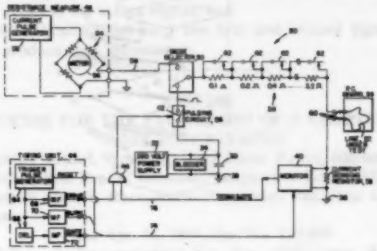
(j) repeating step (g) thereby testing for the existence of an open circuit condition for the other selected diode means.

4,697,142

PRINTED CIRCUIT CONDUCTOR TEST SYSTEM

James E. Frushour, Endwell, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Filed Apr. 1, 1985, Ser. No. 718,466
Int. Cl.[4] G01R 31/02
U.S. Cl. 324—158 R 8 Claims



1. A system for testing current capacity of a printed line conductor comprising:

switch means in circuit with said conductor for switching a current thereto;

pulse applying means operatively connected to said switch means for applying a test current pulse to said conductor, said pulse having sufficient power over a predetermined interval of time to burn out a constricted region of a printed line conductor having a cross sectional area less than a predetermined amount of area, said pulse applying means including timing means for driving said switch means and establishing said predetermined time interval, said timing means further providing a burnout time signal which terminates prior to said test pulse to designate a burnout time of shorter duration than said test pulse;

means for monitoring the waveform of a test pulse of current flowing in said conductor as a function of time to determine a condition of said conductor, said waveform varying in accordance with the condition of said conductor, said monitoring means providing a signal designating a type of waveform;

logic means operatively connected to said switch means and responsive to said signal of said monitoring means and to said burnout signal for terminating a flow of the current prior to the end of said predetermined interval when the waveform of said current pulse indicates the occurence of a burnout in said conductor, said logic means operating said switch means to terminate said test current pulse prior to said predetermined interval when said monitoring means indicates a burnout during said burnout time signal; and

wherein said monitoring means comprises means for detecting a peak amplitude of said test current pulse; and means for detecting a stepwise shift in current amplitude from a first current level to a second current current level within the duration of said current pulse, an occurrence of said stepwise shift during said burnout time signal designating a burnout of said conductor.

4,697,143

WAFER PROBE

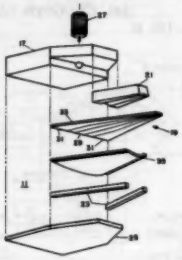
Larry R. Lockwood, McMinnville; Kimberly R. Gleason, and Eric W. Strid, both of Portland, all of Oreg., assignors to Cascade Microtech, Inc., Beaverton, Oreg.

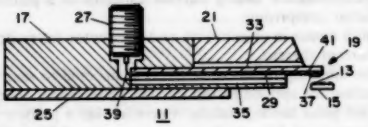
Filed Apr. 30, 1984, Ser. No. 605,462
Int. Cl.[4] G01R 31/00; H01P 3/08
U.S. Cl. 324—158 P 28 Claims

16. A probe for connecting electrical test equipment to selected points on a small planar device on a semiconductive wafer, comprising:

a transmission line assembly having a probe board, at least

one metallic signal conductor and one more than an equal number of metallic ground conductors, the signal and ground conductors being deposited alternately in a coplanar fashion on one side of the probe board;





a metallic channel attached to the ground conductors and spanning, but not touching, the at least one signal conductor; and

selected microwave absorbing material generally surrounding the transmission line assembly, wherein the microwave absorbing material comprises iron.

4,697,144

POSITION SENSING APPARATUS

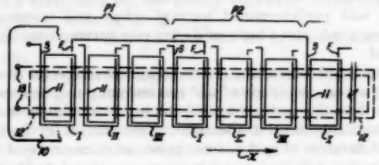
Ernest Howbrook, Stockport, England, assignor to Verify Electronics Limited, Stockport, England

Filed Apr. 10, 1985, Ser. No. 721,653

Claims priority, application United Kingdom, Apr. 19, 1984, 8410364; Sep. 21, 1984, 8423958

Int. Cl.[4] G01B *7/14*

U.S. Cl. 324—207 **9 Claims**



1. Position sensing apparatus having mutually static, coupled primary and secondary coil systems defining a path (x), and an unenergized movable member, devoid of electrical connections, dimensionally much smaller than said path, serving as a localized flux augmenter between the coil systems, and whose position on the path defined by the coil systems is represented as a progressive phase-variable output from the secondary coil system, said output being nominally zero in the absence of said member, characterized in that:

(a) the primary coil system (**12**) is single-phase energized:

(b) the coils (**11A, 11B . . .**, etc) of the secondary coil system (**11**) are:

(i) disposed series connected in pairs (e.g. coils **11A, 11G** in pair **11/1**) interspaced with other pairs (coils **11B, 11H** in pair **11/2**) as an array of coils along said path,

(ii) placed relative to the primary coil system so that on energization of that system the two coils of any pair have reversed polarity signals to generate said nominally zero output, and

(iii) located relatively to the movement of the unenergized member (**60**) so that they are close coupled with said member;

(c) phase shift networks (PC1, PC2 etc) for each pair, or series connected sequence (I, II, III etc) of pairs of secondary coils, said networks giving an incremental phase shifted output as between one pair, or sequence of series connected pairs, and the next; and

(d) means (**65**) combining the incremental phase shifted outputs to give a progressive phase shifted output (**66**) so that the position of the unenergized member is represented by said progressive output.

4,697,145

MEASURING SYSTEM AND MEASURING CELL FOR MAKING MAGNETIC FIELD MEASUREMENTS

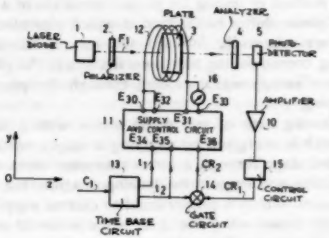
Gérard Doriath, Palaiseau; Pierre Hartemann, Paris, and Alain Jacobelli, St. Michel sur Orge, all of France, assignors to Thomson-CSF, Paris, France

Filed Jan. 24, 1985, Ser. No. 694,275

Claims priority, application France, Jan. 27, 1984, 84 01289

Int. Cl.[4] G01R *33/02*; G02B *5/30*; G02F *1/29, 1/31*

U.S. Cl. 324—244 **4 Claims**



1. An apparatus for measuring a magnetic field using a coating of a ferrimagnetic material into which is passed, in accordance with a given axis, a light beam polarized in accordance with a given plane, in such a way that a magnetic field oriented in accordance with the axis of the beam has a Faraday effect rotation of the light polarizing plane, wherein said apparatus comprises:

a first means for inducing in the ferrimagnetic material coating, along the axis of the light beam, an alternating modulation magnetic field, whose amplitude exceeds the saturation limit of the ferrimagnetic material coating for a first predetermined time adequate to maintain a coherent oscillation of the magnetization in the ferrimagnetic material coating giving rise to an oscillation of the polarizing plane of the light beam, which is symmetrical with respect to said given plane,

a second means for simultaneously, progressively reducing in steps the modulating field intensity, the detection of any asymmetry of the oscillation of the polarizing plane of the light beam with respect to said given plane and induction along the light beam axis of a magnetic field corresponding to the detetion performed and for reestablishing the symmetry of oscillation.

4,697,146

SPHERICAL SHELL FIBRE OPTIC MAGNETIC FIELD SENSORS AND MAGNETOMETERS AND MAGNETIC GRADIENT DETECTORS INCORPORATING THEM

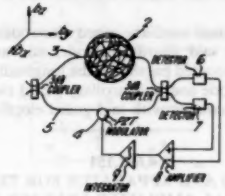
Philip Extance, Shirley, and Roger E. Jones, Little Shelford, both of England, assignors to STC, plc, London, England

Filed Feb. 10, 1986, Ser. No. 827,452

Claims priority, application United Kingdom, Feb. 23, 1985, 8504731

Int. Cl.[4] G01R 33/032; G02B 6/02; G02F 1/09

U.S. Cl. 324—244 8 Claims



1. A magnetic field sensor with an omnidirectional response comprising a magnetically sensitive spherical shell formed by winding a length of magnetically sensitised single mode optical fibre in substantially random directions to produce a spherical shell shape, the fibre having a coating of a magnetostrictive material serving to magnetically sensitise it, disposition of the sensor in a magnetic field causing a corresponding length change of the optical fibre which can be detected interferometrically.

4,697,147

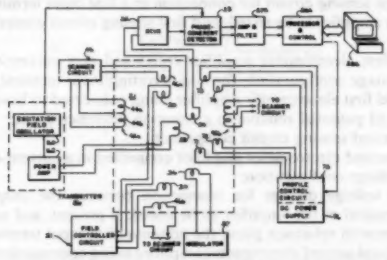
BLOOD FLOW IMAGING USING A CW NMR TECHNIQUE

Paul R. Moran, Winston-Salem, N.C., and Richard E. Halbach, Brookfield, Wis., assignors to Metriflow, Inc., Milwaukee, Wis.

Filed Nov. 14, 1985, Ser. No. 799,848

Int. Cl.[4] G01R 33/20; G01N 24/08

U.S. Cl. 324—306 8 Claims



1. In an NMR flowmeter which measures flow through an active region by applying a polarizing magnetic field having a relatively fixed magnitude in the active region and by applying a transverse excitation field within the active region to produce transverse magnetization in paramagnetic nuclei located in the active region, and receiving the signal produced by the transversely magnetized paramagnetic nuclei, the improved method comprising:

applying a first contoured polarizing magnetic field at one boundary of the active region such that paramagnetic nuclei flowing into said active region through said boundary do so from a region of substantially lower polarizing magnetic field strength;

receiving a first signal produced by the paramagnetic nuclei in the active region;

applying a second contoured polarizing magnetic field at said one boundary of the active region such that paramagnetic nuclei flowing into said active region through said boundary do so from a region of substantially higher polarizing magnetic field strength;

receiving a second signal produced by the paramagnetic nuclei in the active region; and

arithmetically combining the first and second signals to produce flow information.

4,697,148

PROCESS FOR THE EXCITATION OF A SAMPLE FOR NMR TOMOGRAPHY

Bernhard Ströbel, Waldbronn, and Dieter Ratzel, Rheinstetten, both of Fed. Rep. of Germany, assignors to Bruker Medizintechnik GmbH, Rheinstetten-Forchheim, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,808

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414634

Int. Cl.[4] G01R 33/20

U.S. Cl. 324—309 7 Claims

1. In a process for the excitation of a samples for NMR tomography, in which the sample is exposed to a homogenous magnetic field and in addition to a selection gradient and is excited by means of a 90° selection pulse, whereafter the selection gradient is replaced by a phase coding gradient of limited time duration and a read gradient, the selection gradient, the phase coding gradient and the read gradient being mutually perpendicular to each other, and wherein finally the sample, after the ending of the phase coding gradient and with prevailing read gradient, is irradiated with a sequence of 180° pulses, whereby a plurality of core induction signals is generated in the form of so-called spin echos, the improvement comprising the step of subjecting the sample to the influence of the phase coding gradient in such a manner that the dephasing caused by the influences of the phase coding gradient and of the read gradient between each pair of 180° pulses is twice as great as the dephasing effected by the influences of these two gradients before the first 180° pulse.

4,697,149

NMR FLOW IMAGING USING A COMPOSITE EXCITATION FIELD AND MAGNETIC FIELD GRADIENT SEQUENCE

Paul R. Moran, Winston-Salem, N.C., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Nov. 4, 1985, Ser. No. 794,652

Int. Cl.[4] G01R 33/20

U.S. Cl. 324—309 11 Claims

1. In a gyromagnetic resonance instrument which performs a measurement cycle in which a FID signal produced by gyromagnetic material which is subjected to a polarizing magnetic field and has a magnetic moment is detected and processed to produce an indication of the amount of magnetization, the improvement comprising:

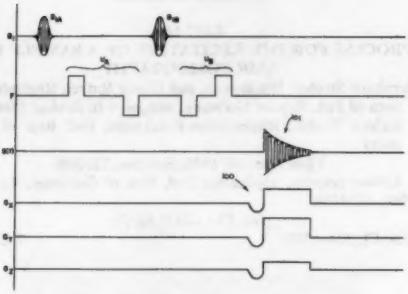
excitation means for applying an excitation field to the gyromagnetic material at the Larmor frequency of the gyromagnetic material and at a controllable strength and phase;

magnetic field gradient means for applying a magnetic field

to the gyromagnetic material which has a gradient in a controlled direction; and

control means coupled to the excitation means and the magnetic field gradient means and being operable to perform a measurement cycle that produces a FID signal indicative of the motion of gyromagnetic material, the measurement cycle including:

(a) applying a first excitation field pulse which tips the net magnetic moment of the gyromagnetic material away from the direction of the polarizing magnetic field;



(b) applying a motion sensitizing magnetic field gradient to the gyromagnetic material which has alternating polarity with respect to the net magnetic moment of the gyromagnetic material and in which the gradient is oriented to the direction in which motion is to be measured;

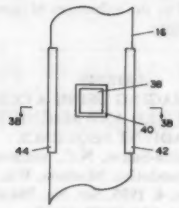
(c) applying a second excitation field pulse having a strength and phase which substantially restores the magnetic moment of stationary gyromagnetic material to the direction of the polarizing magnetic field.

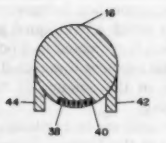
4,697,150

TWO ELECTRODE WELL LOGGING SYSTEM FOR MEASURING RESISTIVITY OF SUBSURFACE FORMATIONS

Gerald L. Marquis, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Oct. 11, 1985, Ser. No. 786,551
Int. Cl.[4] G01V *3/26, 3/18*
U.S. Cl. 324—373 **8 Claims**





1. Apparatus for obtaining indications of the electrical resistivity of relatively thin layers of earth formations traversed by a borehole containing relatively conductive liquids, including a two electrode array to be lowered into a borehole comprising:

an elongated, tubular instrument body member, said entire instrument body member forming an elongated guard electrode member;

a measure electrode mounted within and electrically insulated from said guard electrode member, said measure electrode for emitting a survey current into said earth formations;

means for decentralizing within said borehole said entire guard electrode member and for urging said guard electrode member into contact with the wall of said borehole; and

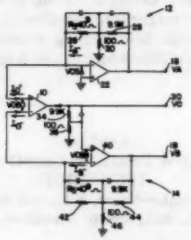
a pair of elongated auxiliary guard electrodes mechanically mounted on said guard electrode, said auxiliary guard electrodes mounted parallel to the longitudinal axis of said guard electrode and said auxiliary guard electrodes being in electrical contact with said guard electrode member.

4,697,151

METHOD AND APPARATUS FOR TESTING OPERATIONAL AMPLIFIER LEAKAGE CURRENT

Gregg A. Butler, Lawrence, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Jun. 5, 1986, Ser. No. 870,829
Int. Cl.[4] G01R *19/00*
U.S. Cl. 330—2 **2 Claims**



1. A system for measuring the leakage currents of an electrometer amplifier, said circuit comprising:

A. a first sensing circuit for connection to a first input terminal of an amplifier to be tested, said first sensing circuit comprising:

i. a first electrometer amplifier connected in a current-to-voltage configuration, the non-inverting input terminal of said first electrometer amplifier being connected to have a fixed potential relative to a common reference point;

B. a second sensing circuit comprising:

i. a second electrometer amplifier connected in a current-to-voltage configuration;

ii. a voltage divider for connection between the output terminal of the amplifier to be tested, if present, and said common reference point, the non-inverting input terminal of said second electrometer amplifier being connected to a tap on said voltage divider.

4,697,152

FULLY DIFFERENTIAL SWITCHED CAPACITOR AMPLIFIER HAVING AUTOZEROED COMMON-MODE FEEDBACK

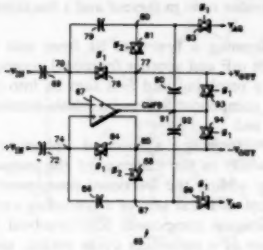
Alan L. Westwick, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 11, 1986, Ser. No. 851,046
Int. Cl.[4] H03F *3/45, 1/34*
U.S. Cl. 330—9 **6 Claims**

1. A switched capacitor fully differential amplifier circuit, comprising:

differential amplifier means having first and second inputs

and first and second outputs, the differential amplifier receiving first and second input voltages via the first and second inputs and providing first and second output voltages via said first and second outputs in proportion to a differential between the first and second input voltages, said differential amplifier maintaining an accurate common-mode output voltage in proportion to a common-mode feedback signal; and



switched capacitor common-mode feedback means coupled to the differential amplifier means for providing said common-mode feedback signal in proportion to a sum of the first and second output voltages, said common-mode feedback means charge storing an error voltage associated with the common-mode output voltage during a nonvalid period of operation and cancelling the error voltage during a valid period of operation following the nonvalid period to provide an accurate common-mode output voltage.

4,697,153

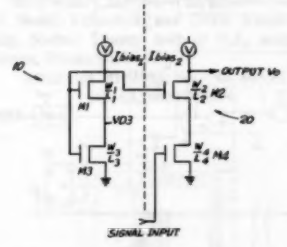
CASCODE AUTO BIAS CIRCUIT

Charles A. Lish, Holbrook, N.Y., assignor to Standard Microsystems Corp., Hauppauge, N.Y.

Filed Sep. 18, 1986, Ser. No. 908,651

Int. Cl.[4] H03F *3/16*

U.S. Cl. 330—277 **1 Claim**



1. A cascode amplifier including an output amplifier stage and a biasing stage, said output amplifier stage comprising a first field effect transistor having a drain, source and gate, the signal established at the drain of said first field effect transistor constituting the output of the cascode amplifier, and a second field effect transistor having a drain connected to the source of said first field effect transistor and a gate for receiving an input signal, and a grounded source, said biasing stage comprising a third field effect transistor having a drain connected to a bias current source and to the gate of said first field effect transistor, and a fourth field effect transistor having a gate connected to the gate of said third field effect transistor and a drain connected to the source of said third field effect transistor, and a grounded source, the ratio of the source-drain channel width to the source-drain channel length of said fourth field effect transistor being selected such that the drain voltage of said fourth field effect transistor is substantially equal to the minimum drain voltage at saturation of said second field effect transistor, whereby the amplitude of the output signal at the drain of said first field effect transistor is at a maximum value and is substantially unaffected and/or optimized by possible variations in the major parameters of said field effect transistors.

4,697,154

SEMICONDUCTOR INTEGRATED CIRCUIT HAVING IMPROVED LOAD DRIVE CHARACTERISTICS

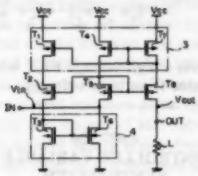
Kunimitsu Kousaka, Kawasaki, and Kunihiko Gotoh, Kunitachi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 12, 1986, Ser. No. 839,027

Claims priority, application Japan, Mar. 18, 1985, 60-052478

Int. Cl.[4] H03F *3/18*

U.S. Cl. 330—277 **4 Claims**



1. A semiconductor integrated circuit, comprising:

first and second power supply terminal means for supplying power;

first and second transistors each having a gate and the gates being connected in common, each having a drain and the drain of said first transistor being connected to the gates of said first and second transistors and each having a source;

input terminal means and output terminal means for providing an output and said input and output terminal means being connected to the respective sources of said first and second transistors;

a first current mirror circuit comprising third, fourth, and fifth transistors each having a gate and the gates being connected in common, each having a source and the sources of said third, fourth, and fifth transistors connected to said first power supply terminal means, each having a drain, the drain of said third transistor being connected to the drain of said first transistor, the gates of said third, fourth, and fifth transistors and the drain of said fourth transistor being connected to the drain of said second transistor; and

a second current mirror circuit comprising sixth and seventh transistors, said sixth transistor being connected between said input terminal means and said second power supply terminal means, and said seventh transistor being connected between the drain of said fifth transistor and said second power supply terminal means.

4,697,155

HIGH VOLTAGE AMPLIFIER

Heinz Lehning, Nyon, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 17, 1986, Ser. No. 853,799

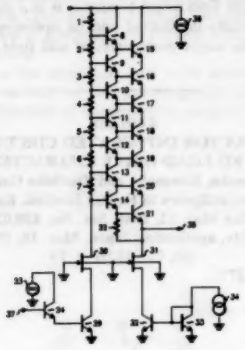
Claims priority, application United Kingdom, May 10, 1985, 8511865

Int. Cl.[4] H03F *3/04*

U.S. Cl. 330—297 **18 Claims**

1. A high voltage amplifier output stage comprising a plurality of low voltage amplifying means connected between a relatively high voltage source and a current source to provide a common output, means for providing a low voltage input to

each of the amplifying means, and means including a low voltage transistor connected to supply an input signal to said



amplifying means via a high voltage FET which protects said low voltage transistor from high voltages.

4,697,156

DIGITALLY CONTROLLED VARIABLE FREQUENCY SYNTHESIZER

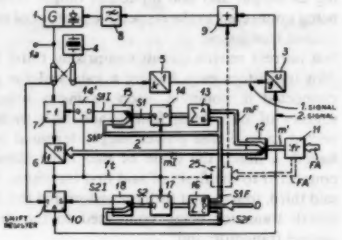
Georg Rudolph, Eningen, Fed. Rep. of Germany, assignor to Wandel u. Goltermann GmbH & Co., Eningen, Fed. Rep. of Germany

Filed Dec. 12, 1986, Ser. No. 941,184

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544371

Int. Cl.⁴ H03L 7/18

U.S. Cl. 331—1 A **18 Claims**



1. A signal generator or synthesizer with digital frequency setting, comprising:

a voltage-controlled oscillator having an output emitting an output signal of a frequency fa controlled in response to a signal applied to a control input of said oscillator;

a loop filter connected to said control input for applying a signal thereto to control the output frequency fa of said oscillator;

a phase detector connected to said loop filter for supplying a control signal thereto for application to said control input, said phase detector having two inputs;

a reference-frequency source connected to one of said inputs of said phase detector for applying a high-precision reference frequency signal fr thereto;

a variable frequency divider ratio divider connected to said output and receiving said output signal of frequency fa therefrom and dividing said frequency fa by a variable frequency divider ratio m to provide a divided-frequency output which is applied to the other of said inputs of said phase detector, said frequency divider, said phase detector and said loop filter forming a phase-locked loop with said voltage-controlled oscillator, said phase detector having a tendency to sawtooth output fluctuations causing frequency drift of the oscillator;

a logic and arithmetic circuit including:

means for determining a generally mixed-number division ratio m′ from a ratio of a desired output frequency FA and said frequency fr, where fa ideally is to equal FA and resolving said ratio m′ into a whole-number component mI which is applied to said divider to set the frequency divider ratio m thereof and a fractional component mF,

means for forming a first sum S1 from said fractional component mF and another fractional component S1F derived by resolving said first sum S1 into said other fractional component S1F and a whole-number component S1I, and

means for forming a second phase-error sum S2=S2I+S2F in the cadence of the output of said divider by adding the fractional component S1F′ resolved from said first sum of a preceding cycle period and a fractional component S2F′ resolved from said second sum in a preceding cycle period, said second sum being defined by S2=S1F′+S2F and being resolved into a second-sum fractional component S2F and a second-sum whole-number component S2I; and

a phase shifter connected between said divider and said phase detector and controlled by said second-sum whole-number component S2I to compensate for said tendency and stabilize the output frequency of said oscillator.

4,697,157

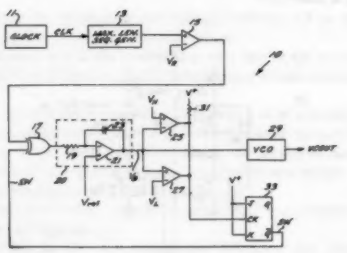
INHERENTLY FLAT SPECTRAL DENSITY PSEUDORANDOM NOISE GENERATOR

Charles L. Buddecke, Fullerton, and Robert F. Graham, Jr., Yorba Linda, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 17, 1986, Ser. No. 921,163

Int. Cl.⁴ H03B 29/00

U.S. Cl. 331—78 **28 Claims**



1. A noise generator comprising:

clock means for providing a clock signal having a selectable frequency;

means responsive to said clock signal for providing a digital signal having a pseudorandom sequence at a rate controlled by the clock means;

modulation means for providing a linearly changing modulation signal having a slope, the modulation means also for being responsive to said pseudorandom digital signal wherein the direction of the slope is controlled by said pseudorandom digital signal;

control means for controlling said modulation means so that said modulation signal remains within predetermined maximum and minimum limits; and

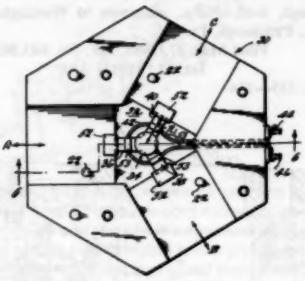
means responsive to said modulation signal for providing an output signal.

4,697,158

REDUCED HEIGHT WAVEGUIDE CIRCULATOR

John C. Hoover, Roswell, and David E. Giese, Duluth, both of Ga., assignors to Electromagnetic Sciences, Inc., Norcross, Ga.

Filed Apr. 15, 1986, Ser. No. 852,146
Int. Cl.[4] H01P 1/39
U.S. Cl. 333—1.1 21 Claims



1. A waveguide circulator comprising:

a conductive waveguide structure having a cavity located therewithin of a first predetermined height and said cavity having plural input/output waveguides of a second lesser predetermined height emanating therefrom:

a ferrite circulator element disposed within said central cavity and having an outer extremity spaced from an inner edge of at least one of said input/output waveguides by a gap G having a predetermined gap dimension which achieves an approximate impedance match between the impedance of the ferrite element and the higher impedance of a reduced height input/output waveguide and

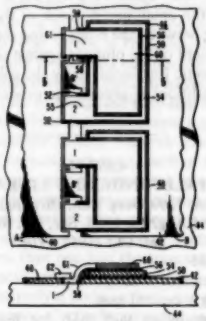
means for creating a magnetic field within said ferrite element and causing it to act as a circulator element.

4,697,159

TUNING CAPACITORS WITH SELECTABLE CAPACITANCE CONFIGURATIONS FOR COUPLING BETWEEN MICROWAVE CIRCUITS

Franco N. Sechi, Princeton, and David Kalokitis, Hamilton Township, Mercer County, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Oct. 31, 1984, Ser. No. 666,811
Int. Cl.[4] H01P 5/04
U.S. Cl. 333—24 C 4 Claims



1. In a microwave circuit comprising an insulating substrate and first and second separated conductors comprising upper and lower surfaces respectively, said lower surfaces being disposed on one surface of said substrate to be capacitively joined, where the upper surfaces of said first and second conductors are in a common plane, a tuning capacitor arrangement comprising in combination:

a first dielectric material layer fabricated atop one of said first and second conductors near to the other of said conductors;

a first conductive area fabricated atop said dielectric layer, the conductive area including at least one conductive bridge extending to a position on said substrate so as to form a tab thereon insulated from said first and second conductors, said tab having a lower surface and an upper surface, such that said upper surface of the tab lies in said common plane and said lower surface lies on said one surface of said substrate;

a second dielectric material layer fabricated atop said first conductive area;

a second conductive area fabricated atop said second dielectric material, said second conductive area including at least one conductive bridge extending to a position on said substrate so as to form a tab thereon insulated from said first and second conductors and first conductive area tab, said tab of said second conductive area having a lower surface and an upper surface, such that the upper surface of said tab lies in said common plane and said lower surface lies on said one surface of said substrate; and

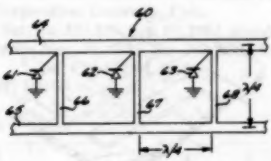
one or more conductive means connecting selected ones of said tabs and the other of said first and second conductors to determine the total capacitance between said first and second conductors.

4,697,160

HYBRID POWER COMBINER AND AMPLITUDE CONTROLLER

Robert T. Clark, Buena Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 19, 1985, Ser. No. 811,870
Int. Cl.[4] H01P 5/16, 5/18
U.S. Cl. 333—103 3 Claims



1. A hybrid network power combiner and controller device operable at microwave frequencies, comprising:

a multi-branch hybrid power combiner circuit, comprising two main transmission lines coupled by at least three branch transmission lines which are an odd number of quarter-wave lengths of a frequency of interest in length; and

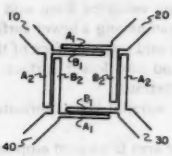
means for selectively shorting to ground each junction between one of said main transmission lines and each of said branch transmission lines.

4,697,161

DIRECTIONAL COUPLERS OF THE BRANCHLINE TYPE

Carlo Buoli, Mirandola, Italy, assignor to 501 GTE Telecomunicazioni S.p.A., Milan, Italy

Filed Sep. 5, 1985, Ser. No. 773,688
Claims priority, application Italy, Oct. 30, 1984, 23387 A/84
Int. Cl.[4] H01P *5/18*
U.S. Cl. 333—116 **2 Claims**



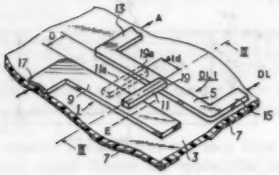
1. A directional coupler of the 3 dB and 90° branchline type, comprising:
first, second, third and fourth ports;
first, second, third and fourth pairs of coupled lines of microstrip construction;
a first branch, including connections to one of said first pair of coupled lines and one of said fourth pair of coupled lines,
forming said first port;
a second branch, including circuit connections to the other of said first pair of coupled lines and one of said second pair of coupled lines forming said second port;
a third branch, including circuit connections to the other of said second pair of coupled lines and one of said third pair of coupled lines, forming said third port;
a fourth branch, including circuit connections to the other of said third pair of coupled lines and the other of said fourth pair of coupled lines, forming said fourth port;
said first and third ports positioned geometrically opposite each other and including circuit connections to an associated circuit;
and said second and fourth ports unconnected to an associated circuit.

4,697,162

VARIABLE DELAY LINE SYSTEM

Kazuo Kameya, Tsurugashima, Japan, assignor to Elmec Corporation, Saitama, Japan

Filed Feb. 5, 1986, Ser. No. 826,374
Int. Cl.[4] H01P *9/00, 3/08*; H03H *7/34*
U.S. Cl. 333—161 **12 Claims**



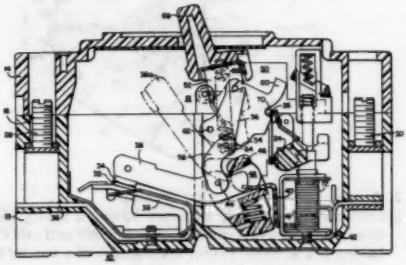
1. A variable delay line system, comprising:
a variable delay line comprising an insulating base board, an electroconductive strip formed on one surface thereof, and a ground plane formed on the other surface thereof, said electroconductive strip having two output ends and a plurality of input points defined therealong;
selection means for selecting one of said input points of said variable delay line and for inputting a signal thereto, comprising an input circuit formed on said base board along and spaced apart from said electroconductive strip, and a connecting piece which selectively connects said input circuit to one of said input points; and
switching means for selectively switching a signal from one of said output ends and outputting said signal.

4,697,163

CIRCUIT BREAKER WITH IMPACT TRIP DELAY

Kurt A. Grunert, Beaver Boro, and James R. Farley, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 27, 1986, Ser. No. 845,302
Int. Cl.[4] H01H *9/00*
U.S. Cl. 335—174 **6 Claims**



1. A circuit breaker comprising:
a pair of separable contacts including a movable contact;
a movable contact arm carrying the movable contact and movable between open and closed positions of the contacts;
an operable mechanism for actuating the contact arm and comprising a pivotally supported releasable member;
latching means for latching the releasable member and including a latch lever movable between latched and unlatched positions of the releasable member;
trip means including a trip bar for releasably holding the latch lever in the latched position;
trip delay means for avoiding premature unlatching of the trip bar and including a body movable against the trip bar and biased away therefrom;
an electromagnetic device responsive to a predetermined overcurrent condition and including a solenoid coil and a plunger for moving the body against the trip bar to an unlatched position thereof;
the plunger being slidably mounted on the body for movement of the body against the trip bar to thereby move the trip bar to the unlatched position of the latch lever; and
a delay spring between the plunger and the body for controlling movement of the plunger against the body by a force of the magnetic flux incurred by the solenoid coil as overcurrent conditions approach the predetermined overload conditions.

4,697,164

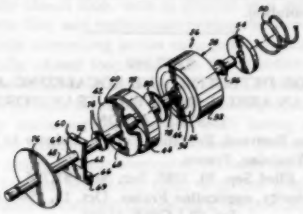
INCREMENTALLY INDEXING LINEAR ACTUATOR

John L. Ellertsen, 7300 Deep Run, Birmingham, Mich. 48010

Filed Aug. 18, 1986, Ser. No. 897,511
Int. Cl.[4] H01F *7/08*
U.S. Cl. 335—253 **36 Claims**

1. A linear actuator which comprises:
a shaft having a central axis,
first means mounting said shaft for linear motion in the direction of said axis,
second means carried by said shaft for sliding motion in the direction of said axis,
latching means having a first end pivotally mounted to said

second means eccentrically of said axis, a central portion which extends laterally across said axis along one face of said second means and has an aperture which embraces said shaft, and a second end free to move with respect to said second means, and



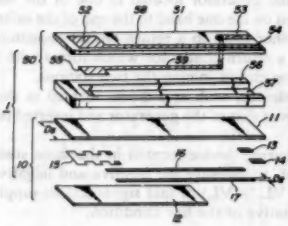
third means carried in fixed position on said first means and operatively coupled to said second means for moving said second means along said axis in a direction opposed to said one face, motion of said second means pivoting said latching means at said one end to grip said shaft at said aperture and move said shaft conjointly with said second means.

4,697,165

CERAMIC HEATER AND A METHOD OF MANUFACTURING THE SAME

Fujio Ishiguro, Nagoya, and Hideo Maeda, Kani, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Oct. 23, 1985, Ser. No. 790,539
Claims priority, application Japan, Nov. 1, 1984, 59-228874
Int. Cl.[4] H01C *7/00*
U.S. Cl. 338—34 **14 Claims**



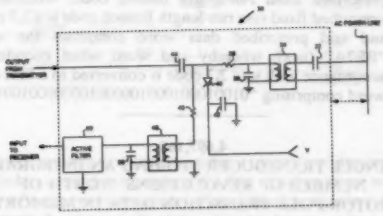
4. An oxygen sensor element comprising a heater unit and a sensor unit; said heater unit comprising an elongated plate-like ceramic substrate having a first end portion and a second end portion and a transverse width, a resistance heating element arranged in the vicinity of said first end portion of said ceramic substrate, said resistance heating element having two electrical connections and a pair of elongated strip-like conductive lead members, each of said lead members extending from one connection of said resistance heating element toward the second end portion of said ceramic substrate, each of said conductive lead members having a specific electrical resistance which is less than a specific electrical resistance of said resistance heating element and each of said lead members having a transverse width, wherein a sum of the transverse widths of the lead members is not more than one half the transverse width of the ceramic substrate; said sensor unit comprising an oxygen ion-conducting solid electrolyte body, at least one measuring electrode and one reference electrode arranged in the vicinity of said first end portion of said solid electrolyte body, and conductive lead members extending from each of said measuring and reference electrodes toward said second end portion of said solid electrolyte body; wherein said heater unit is integrally attached to said sensor, thereby heating at least one of said electrode and said reference electrode.

4,697,166

METHOD AND APPARATUS FOR COUPLING TRANSCEIVER TO POWER LINE CARRIER SYSTEM

Thomas J. Warnagiris, and William H. McGinnis, both of San Antonio, Tex., assignors to Nippon Colin Co., Ltd., Komaki, Japan

Filed Aug. 11, 1986, Ser. No. 896,111
Int. Cl.[4] H04M *11/04*
U.S. Cl. 340—310 R **11 Claims**



1. An apparatus for coupling a transceiver to an AC power line, said transceiver comprising a transmitter portion for providing a first data signal at a first frequency and a receiver portion for receiving a second data signal at a second frequency, comprising:

a resonant circuit for coupling said first data signal to said power line and for receiving said second data signal from said power line, said resonant circuit having first and second terminals, said first terminal connected to said power line, said second terminal connected to said transmitter to receive said first data signal therefrom, said resonant circuit defining a first bandpass filter for filtering said first and second data signals;

a second bandpass filter having first and second terminals, said first terminal of said second filter being connected to said second terminal of said resonant circuit to receive said second data signal therefrom, said second terminal of said second filter connected to said receiver; and

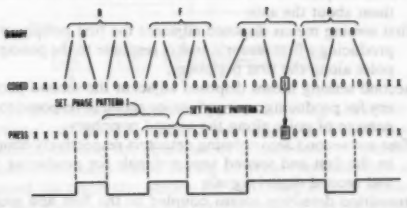
means for isolating said AC power line and said resonant circuit from said second bandpass filter.

4,697,167

SYNC PATTERN ENCODING SYSTEM FOR DATA SECTORS WRITTEN ON A STORAGE MEDIUM

Michael J. O'Keeffe; James M. Graba, both of Longmont, and George I. Noyes, Boulder, all of Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Continuation of Ser. No. 533,826, Sep. 19, 1983, abandoned. This application Nov. 21, 1985, Ser. No. 838,181
Int. Cl.[4] H03M *5/00*
U.S. Cl. 340—347 DD **7 Claims**



1. A method of generating a unique sync pattern for use with a group of valid data words that are encoded according to a

prescribed fixed rate run-length limited code, said method comprising the steps of:

(a) encoding a prescribed data word in accordance with said fixed rate run-length limited code; and

(b) changing at least one of the bits of said enclosed prescribed data word such that the resulting bit pattern of the changed encoded prescribed word still complies with the coding requirements of the prescribed fixed rate run-length limited code yet does not represent any valid encoded data word that can occur through encoding data according to said code, whereby the changed encoded word may be distinguished from other encoded data words, yet processed and handled in the same manner as are all the data words encoded in accordance with said prescribed fixed run-length limited code, wherein the prescribed fixed rate run-length limited code is a 2,7 code, and said prescribed data word comprises the word "BF7A" (hex), whereby said word when encoded in accordance with said 2,7 code is converted to a first code word comprising "01001000100010000010000000100100".

4,697,168

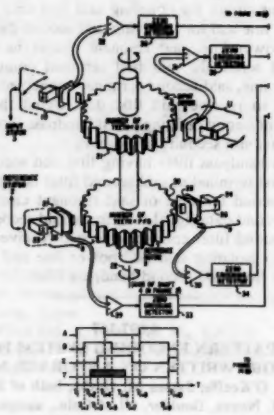
ANGLE TRANSDUCER STORING AN INTEGRAL NUMBER OF REVOLUTIONS' WORTH OF ROTOR-POLE TRANSITION DATA IN MEMORY

Alan J. Baker, 10329 33rd Ave. S.E., Everett, Wash. 98204

Division of Ser. No. 479,043, Mar. 25, 1983, Pat. No. 4,630,033. This application Oct. 20, 1986, Ser. No. 920,830

Int. Cl.[4] H03K *13/02*; G06F *15/20*

U.S. Cl. 340—347 P **6 Claims**



1. A transducer comprising:

first and second rotors journalled for simultaneous and identical rotation about an axis and each having a plurality of poles along respective first and second peripheries;

means coupled to the first and second rotors for rotating them about the axis;

first sensing means disposed adjacent the first periphery for producing a first sensor signal in response to the passage of poles along the first periphery;

second sensing means disposed adjacent the second periphery for producing a second sensor signal in response to the passage of poles along the second periphery;

first and second zero crossing detectors respectively coupled to the first and second sensor signals for producing first and second digital signals;

transition detection means coupled to the first and second digital signals for detecting that at least one of those signals has changed and for producing a trigger signal indicative thereof;

clock means for providing digital time information;

memory means coupled to the first and second digital signals, the digital time information and to the trigger signal for capturing the states of the first and second digital signals and the digital time information upon the occurrence of the trigger signal, and for storing therein state and time data for the first and second rotors over at least one revolution.

4,697,169

DEVICE FOR DETECTING AND LOCALIZING A FAULT IN AN AERIAL ROPE-WAY TRANSPORT INSTALLATION

Jean-Jacques Bertrand, Fontaine, France, assignor to Pomagalski S.A., Fontaine, France

Filed Sep. 30, 1985, Ser. No. 781,726

Claims priority, application France, Oct. 15, 1984, 84 15867

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—540 **13 Claims**

1. A detection device of the electrical condition of a safety line extending along the whole length of an aerial ropeway transport installation between the two terminal stations and comprising a plurality of electrical contacts located at intervals along the line, said contacts being electrically connected in series in the line and controlled for opening by fault detectors, notably of a rope derailment, comprising:

an AC signal generator located in one of the stations and connected on the one hand to the end of the safety line and on the other hand to a return circuit constituted by the earth or a return conductor which forms with the safety line a loop circuit joining the two stations,

a rectifier device, such as a diode, located in the opposite station from that of the generator and inserted in said loop circuit,

and a measuring device located in the same station as the generator, to measure the positive and negative alternations (+VL, −VL) of said signal and to supply a signal representative of the line condition.

4,697,170

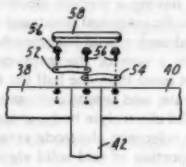
METHOD FOR MINIMIZING FALSE ALARMS AND ELECTRONIC NOISE IN ELECTRONIC ARTICLE SURVEILLANCE SYSTEMS.

Earl B. Hoekman, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 31, 1985, Ser. No. 793,203

Int. Cl.[4] G08B *13/24*

U.S. Cl. 340—551 **4 Claims**



1. A method of minimizing false alarms and high noise envi-

ronments potentially present in electromagnetic article surveillance systems in which a magnetic field alternating at a predetermined frequency is created in an interrogation zone and signals corresponding to harmonics of the predetermined frequency are detected, wherein in the vicinity of the interrogation zone are present metallic structures forming at least one substantially closed loop, such as created by a metallic door frame or the like, said method comprising the step of

electrically connecting across each joint of each such substantially closed loop at which the effective resistance may be variable, at least one section of conductive material to provide across all said joints a highly conductive, highly stable parallel electrical path having a low and constant effective resistance, thereby preventing large rapid changes in the alternating currents induced in said loop by said alternating field, with the result that the generation of currents alternating at frequencies which are high order harmonics of the alternating field are also prevented and confusion with marker produced harmonic signals is avoided, while also avoiding artifically high background electrical noise which tends to mask the detection of said marker produced signals.

4,697,171

ELECTRONIC LOCK AND KEY

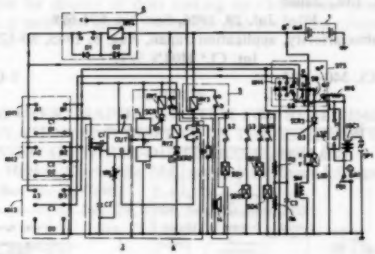
Kyung S. Suh, Seoul, Rep. of Korea, assignor to Dsung Precision Company, Seoul, Rep. of Korea

Filed Jan. 27, 1986, Ser. No. 823,103

Claims priority, application Rep. of Korea, Mar. 25, 1985, 85-1940

Int. Cl.[4] E05B *45/06*; B60R *25/04*

U.S. Cl. 340—543 **12 Claims**



10. An electronic lock and key for use with vehicles comprising an electronic key which produces a predetermined unlocking signal to unlock said lock when said key is an authorized key and is inserted within said lock, an electronic lock having at least two key holders for receiving said key, an alcohol sensing means, a power source, wherein each of said key holders is coupled to a start switch and a control switch to comprise a start/switching means, said start/switching means being coupled between said lock and a starting system for said vehicle, said starting system including an ignition coil so that when said lock is unlocked by the insertion of said authorized key, power from said power source is supplied to said starting system thereby initiating operation of said starting system, wherein said alcohol sensing means is coupled between said power source and said ignition coil of said vehicle, so that when said alcohol sensing means receives an input representing intoxication of a driver, said alcohol sensing means prevents said ignition coil from receiving power from said power source, thereby preventing the operation of said starting system and said vehicle when said driver is intoxicated.

4,697,172

FIRE ALARM SYSTEM

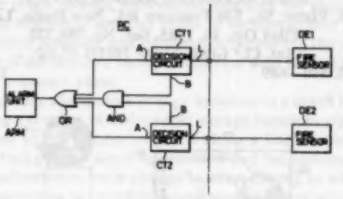
Tetsuo Kimura, Tokyo, Japan, assignor to Nittan Company, Limited, Japan

Filed Sep. 25, 1985, Ser. No. 780,094

Claims priority, application Japan, Dec. 25, 1984, 59-272098

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—587 **2 Claims**



1. In a fire alarm system comprising a plurality of fire sensors installed in a monitoring area and a fire signal receiver which issues a fire alarm in response to fire detection signals outputted by said fire sensors, the improvement wherein said receiver comprises:

a plurality of decision means receiving said fire detection signals from said fire sensors for producing fire occurrence signals representing a first level of probability that a fire has occurred and decision signals representing a second, lower, level of probability that a fire has occurred; and

fire alarm means for issuing a fire alarm when one of said fire occurrence signals is outputted or at least two said decision signals are produced, wherein said fire sensors comprise on-off type fire sensors, and each of said decision means produces a fire occurrence signal when the respective fire sensor has operated plural times within a predetermined period of time.

4,697,173

LOAD SENSING ALARM CONDITION MONITOR

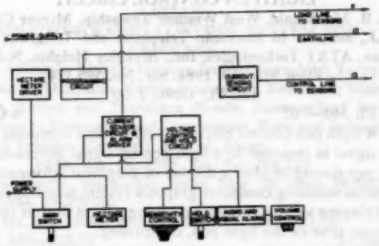
Dale R. Stokes, P.O. Box 58, Mingenew, Australia

Filed Apr. 10, 1985, Ser. No. 721,578

Claims priority, application Australia, Apr. 10, 1984, PG4507

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—684 **13 Claims**



1. A monitoring means for apparatus having a number of functional stations, said means comprising a plurality of sensors located to monitor the operation of at least some of said functional stations, each sensor having a critical condition indicator adjacent the respective station for indicating at least an alarm state and a non-alarm state, a central monitor having a power supply connected via a common connection to each of the sensors and a common signal line connected to the output of each of said sensors wherein each sensor provides an output on

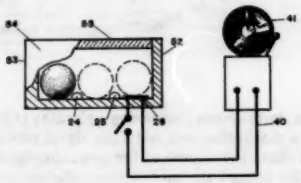
activation of the critical condition means activated through said signal line wherin each sensor provides an output signal to said signal line for effecting the alarm means to be activated and wherein said central monitor means includes manually actuable hold switching means coupled via a common control line to each of the sensors for latching the state of each of said condition indicators.

4,697,174

BALL ACTUATED ALARM DEVICE

John R. Viator, Sr., 530 Freetown Rd., New Iberia, La. 70560

Filed Oct. 10, 1985, Ser. No. 786,325
Int. Cl.[4] G08B *21/00*; H01H *35/02*
U.S. Cl. 340—689 **16 Claims**



1. A device for detecting a tilted condition of a structure, comprising:

a substantially even floor plate divided into first, second and third regions by first and second protuberances projecting from the floor plate;

a ball supported on said floor plate;

a ball-actuated switch in the third region of the floor plate;

an alarm means in a circuit connected to the switch for signaling a warning when the switch is activated by said ball;

wherein the diameter of said ball is sufficiently greater than the height of the first protuberance to allow the ball to move over the first protuberance and into the second region when the structure to which the device is attached tilts to a predetermined angle; and

wherein the second protuberance is of substantially the same height as the first protuberance, so that continued tilt of the structure will move the ball into the third region and activate the alarm.

4,697,175

LIGHTPEN CONTROL CIRCUIT

John B. Macdonald, West Windsor Township, Mercer County, N.J., assignor to American Telephone and Telegraph Company, AT&T Technologies, Inc., Berkeley Heights, N.J.

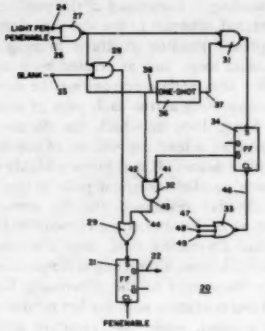
Filed Mar. 30, 1984, Ser. No. 595,124
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—707 **6 Claims**

1. A light pen control circuit for releasing a computer interrupt signal in response to a light pen hit signal generated by a light pen during or after a display of graphical information by a random scanning computer graphics system which is capable of displaying vectors having a drawing period shorter than the response time of the light pen, comprising:

means for generating a computer interrupt signal in response to a light pen hit signal generated within a predetermined interval corresponding to the display of graphical information or a prescribed period immediately thereafter;

means for determining whether the light pen hit signal occurred during or after the display of graphical information;

means for releasing the computer interrupt signal when the light pen hit signal occurred during the display of graphical information and for storing the computer interrupt signal when the light pen hit signal occurred after the display of graphical information; and



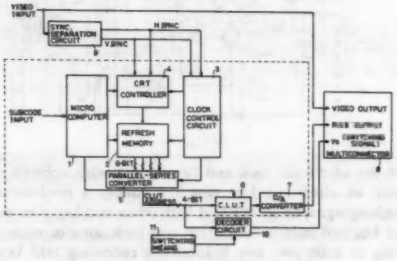
means for selectively releasing the stored computer interrupt signal contemporaneously with a display of subsequent graphical information.

4,697,176

VIDEO SUPERIMPOSITION SYSTEM WITH CHROMA KEYING

Kiyotada Kawakami, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Japan

Filed Jul. 29, 1986, Ser. No. 891,698
Claims priority, application Japan, Aug. 6, 1985, 60-172753
Int. Cl.[4] H04N *9/75*
U.S. Cl. 340—723 **2 Claims**



1. A graphic decoder circuit for generating picture switching signals to superimpose pictures based on RGB video signals obtained on the basis of color code signals recorded in a record medium on pictures based on other video signals, said graphic decoder circuit comprising:

color signal generation means addressed by said color code signals from said record medium for outputting said RGB video signals in correspondence to the designated addresses; and

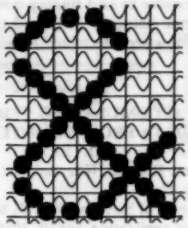
decoder means for decoding said color code signals to output said picture switching signals on the basis of specific color code signals, said decoder means including manually operable switching means for selecting one of said color code signals for producing said picture switching signal.

4,697,177

HIGH RESOLUTION DOT-MATRIX CHARACTER DISPLAY

Jonathan M. Schine, Los Angeles, Calif., assignor to High Resolution Television, Inc., Los Angeles, Calif.

Filed Dec. 26, 1984, Ser. No. 686,220
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—728 6 Claims



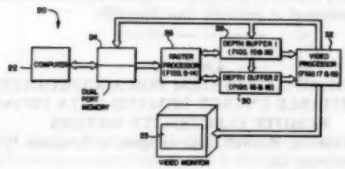
1. A method of displaying on a cathode ray tube having an intensity and raster-scan controlled beam enhanced resolution alphanumeric and other characters, including symbols of conventional and arbitrary form, in a dot-matrix of rows defined by raster scans and columns utilizing a HOM character generator comprising the steps of storing in said ROM character generator a qMxn matrix of binary 1's and 0's, said binary 1's representing dots created by intensity control of said beam making up characters to be displayed, where q is an integer greater than one for generating more than one dot for display in each dot space of an Mxn matrix, M is the number of horizontal dot spaces in each row, and n is the number of rows of dot spaces in a character matrix, and cyclically modulating in a vertical direction the cathode ray tube beam above and below the horizontal center of each row at a predetermined fixed rate for display of dots making up characters, thereby displacing said dots above and below said horizontal center of each row.

4,697,178

COMPUTER GRAPHICS SYSTEM FOR REAL-TIME CALCULATION AND DISPLAY OF THE PERSPECTIVE VIEW OF THREE-DIMENSIONAL SCENES

Todd A. Heckel, Clarksville, Md., assignor to Megatek Corporation, San Diego, Calif.

Filed Jun. 29, 1984, Ser. No. 626,385
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—729 38 Claims



1. A process for generating and displaying perspective images, without hidden surfaces on a view reference plane on a display device for scanning a pluraity of scanning lines in a raster with each line having a plurality of addressable pixels, of a scene having one or more three-dimensional objects in which each object has one or more planar surfaces comprising:

(a) storing the one or more objects to be displayed as a three-dimensional mathematical representation;

(b) processing the three-dimensional mathematical representation of the one or more objects to generate a list of line segments along the direction of scanning of the intersection of the scanning lines in the view reference plane with the one or more surfaces of the one or more objects with line segments from each line of scanning being stored in a separate line storage location which is addressed by the line from which the line segments were generated, each stored line segment including display information for each of the pixels therein, information enabling the identification of beginning and end pixels of its intersection along the line of scanning and information permitting the calculation of the depth of each pixel therein with respect to the view reference plane;

(c) initializing addressable storage locations in a depth buffer having a number of addressable storage locations equal in number to the number of pixels along a line of scanning with background depth information and background display information, each storage location having an address corresponding to one of the pixels along a line of scanning;

(d) processing sequentially in time the line storage locations in the order of scanning on the display device, each line storage location being individually processed to calculate for each pixel within each line segment stored therein its depth with respect to the view reference plane;

(e) comparing sequentially in time the calculated depth information of each line storage location with depth information stored in the depth buffer in the order of scanning on the display device, the calculated depth information of each line storage location being processed by comparing the calculated depth of each pixel within each line segment with depth information stored in the depth buffer at the corresponding address;

(f) storing calculated depth information and display information in the storage locations of the depth buffer sequentially in time for each of the line storage locations in the order of scanning on the display device, the calculated depth information and display information of each of the pixels of the line segments of each line storage location being stored in the depth buffer at the corresponding address when during the comparing the calculated depth information is determined to be closer to the view reference plane than the depth information stored at the corresponding address of the depth buffer to generate a line of display information; and

(g) displaying the display information stored within the addressable storage locations of the depth buffer sequentially in time on a line by line basis.

4,697,179

INDUCTIVE RADIO CONTROL SYSTEM FOR VEHICLES

Hiroshi Arimitsu; Kiyoshi Hatano, both of Kurashiki; Teruyuki Nakanishi, Okayama; Yoshio Yoshimura, Kurashiki; Masaki Urabe, Tokyo, and Tsurakazu Honda, Zama, all of Japan, assignors to Kawasaki Steel Corporation, Kobe and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Filed Mar. 26, 1985, Ser. No. 716,228
Claims priority, application Japan, Mar. 28, 1984, 59-58189; Oct. 5, 1984, 59-209510
Int. Cl.[4] H04Q *9/00*; H04B *7/00*; B61L *25/00*
U.S. Cl. 340—825.72 5 Claims

1. An inductive radio control system for vehicles comprising:

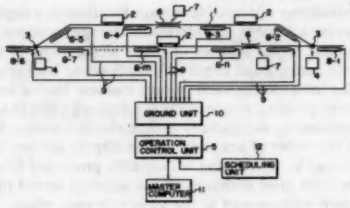
a traveling path;

a plurality of traveling means for traveling along the traveling path;

first transmitting/receiving means mounted on the traveling means, the first transmitting/receiving means including means for generating a first carrier signal having a first frequency, first tone generator means for generating a

plurality of first tone signals of different frequencies representing different operating states of said traveling means, and means for modulating the first carrier signal by the first tone signals for generating a traveling means monitoring signal;

a plurality of ground loop antenna means separately arranged along the traveling path, each of the ground loop antenna means including means for receiving said traveling means monitoring signal to obtain a carrier detection signal representing that one of said traveling means exists at the ground loop antenna means by detecting said first carrier signal, and means for transmitting a traveling means control signal to the first transmitting/receiving means;



second transmitting/receiving means including means for generating a second carrier signal of second frequency, second tone generator means for generating a plurality of second tone signals of different frequencies representing different operation states of the traveling means designated in accordance with a predetermined working schedule, and means for modulating the second carrier signal by the second tone signals for generating the traveling means control signal, wherein the number of said second transmitting/receiving means is set the same as the number of said traveling means; and

selecting means for selectively coupling the second transmitting/receiving means to one of the ground loop antenna means in accordance with an obtained carrier detection signal.

4,697,180

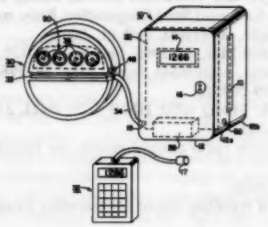
SYSTEM FOR ACCUMULATING VERIFIABLE ENERGY DEMAND DATA FROM REMOTE ELECTRICITY METERS

Scott C. Swanson, Roswell, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 776,719, Sep. 16, 1985, Pat. No. 4,639,778. This application Apr. 9, 1986, Ser. No. 849,896

Int. Cl.[4] G08B *1/08*

U.S. Cl. 340—870.02 **24 Claims**



1. A system for accumulating energy demand data from an electricity meter, comprising:

memory means for storing demand data accumulated during predetermined time intervals;

means for transmitting stored demand data from said memory means to a central computer over a telephone line at periodic time intervals; and

command means for receiving control commands from a central computer over said telephone line, said command means comprising telephone ring detecting means for detecting a ringing condition on said telephone line, and means responsive to said ringing condition for answering said telephone line only after said ringing condition has continued for a predetermined length of time.

4,697,181

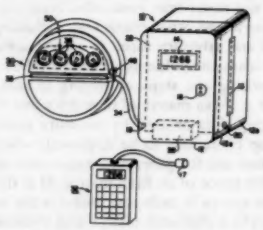
SYSTEM FOR ACCUMULATING VERIFIABLE ENERGY DEMAND DATA FROM REMOTE ELECTRICITY METERS

Scott C. Swanson, Roswell, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 776,719, Sep. 16, 1985, Pat. No. 4,639,728. This application Apr. 9, 1986, Ser. No. 849,898

Int. Cl.[4] G08B *1/08*

U.S. Cl. 340—870.02 **26 Claims**



14. A system for accumulating energy demand data from an electricity meter of a type having means for generating pulses at a predetermined rate corresponding to a demand rate, comprising:

means for detecting pulses generated by said meter;

scaling means responsive to pulses detected by said detecting means for providing a scaled count corresponding to a predetermined number of pulses during a first predetermined measurement interval;

means responsive to said scaled count during a second predetermined measurement interval for developing demand data, said demand data corresponding to a plurality of said pulses;

memory means for storing said demand data during predetermined time intervals; and

means for transmitting said stored demand data from said memory means to a central computer over a communications channel at periodic time intervals.

4,697,182

METHOD OF AND SYSTEM FOR ACCUMULATING VERIFIABLE ENERGY DEMAND DATA FROM REMOTE ELECTRICITY METERS

Scott C. Swanson, Roswell, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 776,719, Sep. 16, 1985, Pat. No. 4,639,728. This application Apr. 9, 1986, Ser. No. 849,899

Int. Cl.[4] G08C *19/16*

U.S. Cl. 340—870.02 **20 Claims**

1. A system for accumulating energy demand data from an electricity meter of a type having means for generating pulses corresponding to a demand rate comprising:

means for detecting pulses generated by said meter;

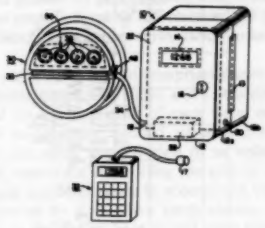
means for counting the pulses detected by said detecting

means during a predetermined measurement interval to develop demand data;

memory means for storing said demand data during predetermined time intervals;

means for transmitting stored demand data from said memory means to a central computer over a telephone line at periodic time intervals;

error condition detecting means for detecting the existence



of an eror condition in said system, said error condition corresponding to a meter error, and further comprising timing means responsive to pulses detected by said detecting means for indicating said meter error in response to the failure by said detecting means to detect a pulse within a predetermined time period, and

means responsive to said error condition for transmitting information corresponding to said error condition to said central computer over said telephone line.

4,697,183

MEANS FOR NON-CONTACTING SIGNAL AND ENERGY TRANSMISSION

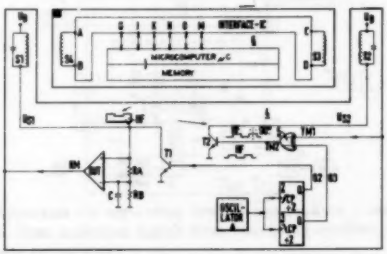
Michael Jenning, and Holger Mackenthun, both of Hamburg, Fed. Rep. of Germany, assignors to Angewandte Digital Elektronik, Fed. Rep. of Germany

Filed Dec. 19, 1985, Ser. No. 810,558

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3447560

Int. Cl.[4] G08C *19/24, 19/00*

U.S. Cl. 340—870.25 **12 Claims**



9. A device for non-contacting energy and signal transmission between a microstation and a microcomputer controlled microunit, comprising:

a microstation including:

means for generating first and second coherent periodic signals, said first signal being phase shifted by approximately 90 degrees with respect to said second signal;

means for selectively imparting an approximately 180 degree phase shift on one of said first and second signals;

first and second inductive couplers connected to said first and second signal generating means to transmit respective ones of said first and second signals;

a microunit including:

third and fourth inductive couplers mounted for selective coupling said first and second inductive couplers, said third coupler being couplable to said first coupler and said fourth coupler being couplable to said second coupler when said microunit and said microstation are in a first relative position and said third coupler being couplable to said second coupler and said fourth coupler being couplable to said first coupler when said microunit and said microstation are in a second relative position;

an interface connected between said third and fourth coils and said microcomputer, said interface including:

means for phase evaluation of signals at said third and fourth coils,

means for level definition of signals from said phase evaluation means,

means for rectifying signals from said third and fourth coils, and

means for regulating said rectified signal to supply power to said microcomputer;

whereby signal transmission from said microstation to said microunit ensues by said selective phase shifts.

4,697,184

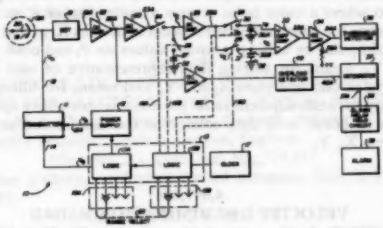
INTRUSION DETECTION RADAR SYSTEM WITH AMPLITUDE AND FREQUENCY CARRIER MODULATION TO ELIMINATE TARGETS AT SHORT AND LONG RANGES

James Cheal; James R. Fitzsimmons, and Edward J. Foley, all of Tempe, Ariz., assignors to Southwest Microwave, Tempe, Ariz.

Filed Feb. 9, 1984, Ser. No. 578,539

Int. Cl.[4] G01S *13/56, 13/38;* **G08B** *13/24*

U.S. Cl. 342—28 **24 Claims**



1. A method of reliably detecting intruding targets in a protected region, said method comprising the steps of:

(a) operating a transmitter to produce a microwave signal having successive, repetitive first and second portions of first and second frequencies, respectively, and radiating said microwave signal from an antenna into said protected region;

(b) operating a receiver to detect a resulting return signal received by said antenna from a target to produce first and second doppler signals corresponding to said first and second frequency portions of said microwave signal, respectively;

(c) operating the receiver to produce a gating signal and using the gating signal to gate said first and second doppler signals during first and second predetermined intervals onto first and second conductors, respectively, to reject any portion of said first and second doppler signals due to targets beyond a predetermined cutoff range;

(d) subtracting one of said gated first and second doppler signals from the other to produce a suppressed doppler signal the amplitude of which is approximately proportional to the range of the reflecting target; and

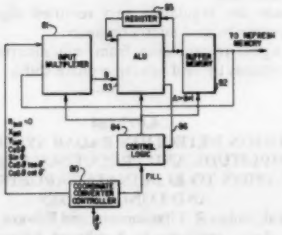
(e) producing an alarm signal in response to said suppressed doppler signal if said suppressed doppler signal exceeds a predetermined magnitude for at least a predetermined interval, to reject any portions of said first and second doppler signals which are due to small, close in targets such as rain on or vibration of a radome enclosing said antenna.

4,697,185

ALGORITHM FOR RADAR COORDINATE CONVERSION IN DIGITAL SCAN CONVERTERS

David M. Thomas, Ottawa, and Leonard J. Tubb, Kanata, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence and Control Data Canada, Ltd., both of Ottawa, Canada

Filed Jul. 1, 1983, Ser. No. 510,251
Claims priority, application Canada, Dec. 23, 1982, 418525
Int. Cl.⁴ G01S *7/44*
U.S. Cl. 342—185 **6 Claims**



1. A system for high speed coversion of polar coordinates of radar returns from radially spaced apart radar pulses into cartesian coordinates for storage in a digital memory comprising means for determining an initial X_i,Y_i address corresponding to where a radar pulse crosses a raster display at an angle θ_i, means for determining subsequent addresses X_{i+1} and Y_{i+1} for said pulse by adding constant values $\sin\theta_i$ and $\cos\theta_i$ to X_i and Y_i, means for storing data representative of said radar returns at said addresses X_i and Y_i, and means for filling said display between adjacent radar pulses at ranges where spoking tends to occur with data related to the data stored at each address X_i, Y_i.

4,697,186

VELOCITY DISCRIMINATION RADAR

Robert G. Rock, Coronado, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

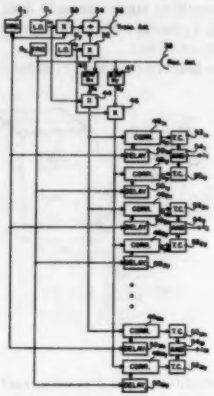
Filed Apr. 30, 1975, Ser. No. 574,169
Int. Cl.⁴ G01S *13/04*
U.S. Cl. 342—189 **15 Claims**

1. A radar system comprising:

a radar signal transmitting means for outputting a radar signal having first and second signal components comprising first and second frequency generating means for producing, respectively, a first frequency generator signal at a first predetermined frequency and a second frequency generator signal at a second predetermined frequency different from said first predetermined frequency;

said radar signal transmitting means further comprising a first Pseudo-Random generator means for generating a first Pseudo-Random sequence for modulating said first frequency generator signal and a second Pseudo-Random generator means for generating a second Pseudo-Random sequence for modulating said second frequency generator signal, the period of said first Pseudo-Random sequence being different from the period of said second Pseudo-Random sequence, whereby the modulated first frequency generator signal comprises said first signal component and the modulated second frequency signal comprises said second signal component; and

a radar return signal receiving means for receiving a return



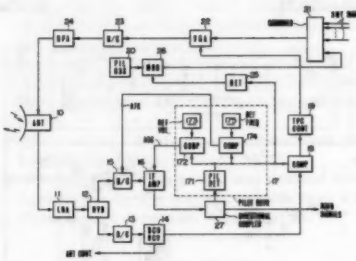
radar signal and for providing an output only upon the simultaneous presence of a main Doppler peak resulting from said first signal component and a main Doppler peak resulting from said second signal component.

4,697,187

PRECIPITATION LOSS COMPENSATION AND DISABLEMENT FOR AVOIDANCE OF SATELLITE TRANSPONDER OVERLOADING

Satoru Ohno, and Yasuhisa Shimada, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Mar. 4, 1985, Ser. No. 707,746
Claims priority, application Japan, Mar. 9, 1984, 59-45260
Int. Cl.⁴ H04R *7/185;* H04B *7/185;* G01S *13/00*
U.S. Cl. 342—358 **3 Claims**



1. A transmitting power control system for a satellite communication network, the network comprising a satellite transponder for transmitting a beacon signal and for receiving and retransmitting a pilot signal from a master earth station having uplinks and downlinks connected through said satellite transponder to respective downlinks and uplinks of a plurality of slave earth stations, wherein:

said master earth station comprises means for generating a pilot signal to be transmitted to said satellite transponder, means for receiving said beacon signal and said retransmitted pilot signal from said transponder, said beacon and pilot signals being received through said downlinks of the master earth station, means for comparing the received

beacon signal with the received pilot signal, first variable gain amplifier means for providing amplification of uplink information signals and the generated pilot signal with a variable gain in accordance with the result of the comparison by said comparing means so that the effective isotropically radiated power of the retransmitted pilot signal is maintained constant, means for disabling said pilot signal generating means when said received pilot signal decreases below a prescribed value corresponding to a predetermined amount of precipitation, and means for transmitting the amplified uplink information and pilot signals on said uplinks of the master earth station to said transponder; and

each of said slave earth station comprises means for receiving the retransmitted pilot signal and a downlink information signal on the downlink of each slave earth station from said transponder, second variable gain amplifier means for providing amplification of an uplink information signal, means for controlling the gain of said second variable gain amplifier means in accordance with the pilot signal received by each slave earth station, and means responsive to the disablement of said pilot signal generating means of said master earth station for disabling said controlling means to prevent said satellite transponder from being overloaded by the uplink information signals transmitted from said slave earth stations on the uplinks thereof.

4,697,188

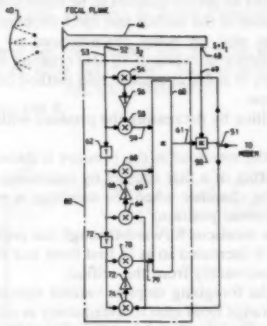
INTERFERENCE CANCELER WITH DIFFERENCE BEAM

Heng-Cheng Lin, North Andover, Mass., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 13, 1985, Ser. No. 701,351

Int. Cl.[4] G01S *3/16*; H04R *7/185*

U.S. Cl. 342—383 **14 Claims**



1. Apparatus for separating desired signals from a target satellite from undesired signals from interfering satellites said apparatus comprising

an antenna for reflecting to its focus said desired signals and said undesired signals,

a waveguide with one of its ends located at the focus of said antenna, a first coupler for extracting the fundamental mode signals from said waveguide and delivering said signals to a first summing circuit,

a second coupler for extracting higher order mode signals from said waveguide and delivering said higher order mode signals to a delay line network, the output from said delay line network being delivered to said first summing circuit, and said first summing circuit adding said fundamental mode signals from said first coupler and said higher order mode signals from said second coupler to derive said desired signals which are substantially free from said undesired signals.

4,697,189

MICROSTRIP ANTENNA

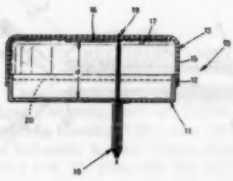
John B. Ness, Pullenvale, Australia, assignor to University of Queensland and Commonwealth of Australia, both of Queensland, Australia

Filed Apr. 24, 1986, Ser. No. 855,488

Claims priority, application Australia, Apr. 26, 1985, PH0328

Int. Cl.[4] H01Q *1/38, 1/42*

U.S. Cl. 343—700 MS **5 Claims**



1. A microwave antenna including:

a ground plate;

a substanially planar support means spaced from the ground plate to provide an air gap therebetween;

a metal patch on the support means, said metal patch being provided on a face of the support means which is directed towards the ground plate;

an electrical conductor means connected to the metal patch and ground plate; and

the support means and the ground plate being provided with complementary peripheral flanges which are adjustably slidably engaged together to hold the support means over the ground plate at a selected spacing therefrom, with the variation of the spacing effecting adjustment of the thickness of the air gap.

4,697,190

BOREHOLE LOCATED DIRECTIONAL ANTENNAE MEANS FOR ELECTROMAGNETIC SENSING SYSTEMS

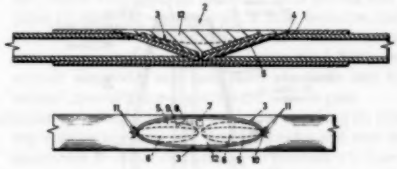
Gordon K. A. Oswald, Huntingdon, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Sep. 23, 1985, Ser. No. 778,915

Claims priority, application United Kingdom, Nov. 2, 1984, 8427792

Int. Cl.[4] H01Q *1/04, 9/20*

U.S. Cl. 343—719 **12 Claims**



1. A directional antenna for locating in a borehole formed in strata, and adapted to form a component of an electromagnetic sensing system, comprising a generally cylindrical tube of electrically conductive material, a portion of the circumference of the tube cut away to define a window, the none cut away portion of the circumference of the tube providing a backing shield for the window, a generally 'V' shaped support of electrically insulating material located in the tube adjacent to the window with the central base portion of the 'V' shape adjacent to the none cut away backing shield, a pair of antenna

elements mounted on, and extending along, the inclined limbs of the generally 'V' shaped support, respectively, and a cover arranged over the antenna elements.

4,697,191

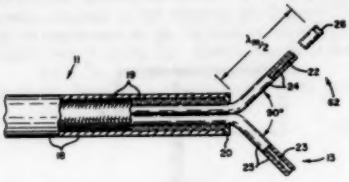
OMNIAZIMUTHAL ANTENNA

Marshall W. Cross, Stow, Mass., assignor to Science Applications International Corporation, La Jolla, Calif.

Filed May 8, 1985, Ser. No. 732,233

Int. Cl.[4] H01Q *9/44, 1/40, 1/04*

U.S. Cl. 343—809 **9 Claims**



1. An antennna adapted for burial, comprising:

(a) a pair of antenna elements aligned along a substantially horizontal plane in substantially mutually orthogonal longitudinal alignment;

(b) the longitudinal dimension of said antenna elements corresponding to about ½ the in-medium wavelength of a preselected frequency; and

(c) electrically balanced, shielded, transmission line means comprising a pair of dielectrically insulated conductors for establishing electrical communication between said antenna elements and an RF receiver/transmitter;

(d) said antenna elements being unshielded, integral, dielectrically insulated end-portions of said conductors, and extending beyond the shielding of said transmission line means.

4,697,192

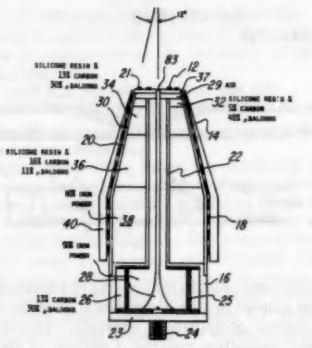
TWO ARM PLANAR/CONICAL/HELIX ANTENNA

Dean A. Hofer, Richardson; Daniel J. Carlson, and Matthew L. Pecak, both of Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 16, 1985, Ser. No. 723,789

Int. Cl.[4] H01Q *1/36*

U.S. Cl. 343—895 **14 Claims**



1. A broadband antenna comprising:

an RF input;

a support means;

an antenna radiation element means mounted on said support means and electrically connected to the RF input and includes an Archimedes' planar spiral antenna electrically connected to the RF input, a conical spiral antenna electrically connected to the Archimedes' planar spiral antenna and a helix antenna electrically connected to the conical spiral antenna; and

internal and external load absorbers internal of and external to the antenna radiation element means whereby said antenna radiation element means and the internal and external load absorbers coact for effectively reducing the size of the broadband antenna.

4,697,193

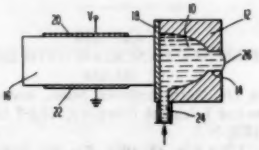
METHOD OF OPERATING AN INK JET HAVING HIGH FREQUENCY STABLE OPERATION

Stuart D. Howkins, Ridgefield, Conn., assignor to Exxon Printing Systems, Inc., Florham Park, N.J.

Continuation of Ser. No. 576,582, Feb. 3, 1984, Pat. No. 4,646,106, which is a continuation-in-part of Ser. No. 336,603, Jan. 4, 1982, Pat. No. 4,459,601, which is a continuation-in-part of Ser. No. 229,994, Jan. 30, 1981, abandoned, which is a continuation-in-part of Ser. No. 384,131, Jun. 1, 1982, Pat. No. 4,509,059. This application Mar. 21, 1986, Ser. No. 842,455

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—1.1 **4 Claims**



1. A method of operating a demand ink jet comprising an ink jet chamber and an orifice adapted to be filled with ink so as to form a meniscus in the orifice and eject droplets of ink from said meniscus, said jet being characterized by at least one resonant frequency in excess of 10 kHz creating an upper limit for a frequency of stable operation, said method comprising the following steps:

initiating filling by decreasing the pressure within the chamber;

retracting the meniscus as the pressure is decreased;

initiating firing of a first droplet by increasing the pressure within the chamber when the meniscus is retracted to a predetermined position;

moving the meniscus forward through the orifice while the pressure is increased so as to first form and then project a droplet outwardly from the orifice;

repeating the foregoing steps at various operating frequencies in a range from zero to a frequency in excess of 5 kHz while always initiating firing from substantially the same said predetermined position for said various operating frequencies in said range; and

projecting droplets at substantially equal velocity for said various operating frequencies in said range.

4,697,194

LAMINA RECORDING APPARATUS

Harry A. H. Spence-Bate, Morley, Australia, assignor to Joyce Florence Spence-bate, Morley, Australia

Filed Feb. 21, 1986, Ser. No. 831,545

Claims priority, application Australia, Feb. 21, 1985, PG9394

Int. Cl.[4] G03B *27/32*; G01D *15/28*

U.S. Cl. 346—110 V **4 Claims**

1. In an apparatus for moving sheet material, said apparatus comprising two generally parallel plates spaced apart to define a chamber within which chamber said sheet material is sup-

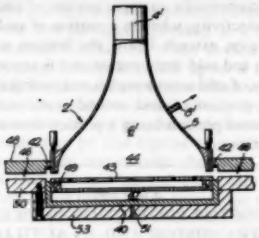
ported on a cushion of gas and moveable in X and Y defineable directions generally parallel to said plates by currents of said gas, the improvement comprising:

a data recording station comprising:

emitter means for imparting data to a recordable sheet of film;

means for holding said film at said station;

a tube having opened and closed ends and means for drawing a vacuum, said emitter means being situated generally



at said closed end, and said open end being communicable with said gas cushion chamber through an opening in at least one of said plates;

a platen spaced opposite of and across said gas cushion from said tube open end so as to present a platen surface over which said film is positioned for reception of said data; and

closure means, structurally separate from said film, for sealingly isolating said tube and platen surface from said gas cushion so as to define an envelope evacuatable by said vacuum drawing means of said tube.

4,697,195

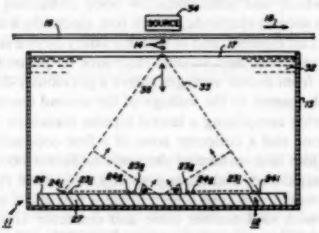
NOZZLELESS LIQUID DROPLET EJECTORS

Calvin F. Quate, Stanford, Conn., and Butrus T. Khuri-Yakub, Palo Alto, Calif., assignors to Xerox Corporation, Stanford, Conn.

Continuation of Ser. No. 776,291, Sep. 16, 1985, abandoned. This application Jan. 5, 1987, Ser. No. 946,682

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **19 Claims**



1. A nozzleless droplet ejector for ejecting droplets of liquid from a surface of a liquid filled reservoir, said ejector comprising

a planar surface acoustic wave transducer which is submerged at a predetermined depth in said reservoir;

drive means coupled to said transducer for energizing said transducer to launch a cone of acoustic waves into said liquid at an angle selected to cause said acoustic waves to come to a focus of predetermined waist diameter approximately at the surface of said reservoir, whereby said focused acoustic waves impinge upon and acoustically excite liquid near the surface of said reservoir to an elevated energy level within a limited area determined by said waist diameter;

said focused acoustic waves having an intensity selected to cause said elevated energy level to be an incipient energy level for droplet formation; and

external means for coupling additional energy into the acoustically excited liquid for extracting droplets from said reservoir on demand.

4,697,196

ELECTROSTATIC RECORDING METHOD AND APPARATUS

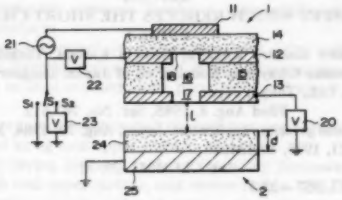
Yutaka Inaba, Kawaguchi; Hiroshi Satomura, Hatogaya; Yukio Nagase; Tatsuo Takeuchi, both of Tokyo; Hidemi Egami, Zama, and Akihito Hosaka, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 10, 1986, Ser. No. 827,431

Claims priority, application Japan, Feb. 13, 1985, 60-25852; Feb. 13, 1985, 60-25853; Jun. 7, 1985, 60-122542

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—159 **48 Claims**



1. An electrostatic recording apparatus, comprising:

a recording member having a surface on which an electrostatic latent image is formed;

a recording head, opposed to the recording surface of said recording member, for forming the electrostatic latent image thereon, said recording head comprising a plurality of first electodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing with said first direction to form a matrix with said first electrodes, a third electrode disposed across said second electrodes from said first electrodes and having first apertures of allowing ions to pass, a first dielectric member between said first electrodes and said second electrodes and a second dielectric member disposed between said second electrodes and said third electrode and having second apertures for allowing the ions to pass;

alternating voltage applying means for applying an alternating voltage between said first electrodes and said second electrodes to effect discharging to produce the ions;

first bias voltage applying means for applying a bias voltage to said second electrode; and

second bias voltage applying means for applying to said third electrode a bias voltage having the same polarity as that of the bias voltage applied to said second electrodes and having an absolute voltage which is smaller than that of the bias voltage applied to said second electrode;

wherein parameters of said means are so determined that the ions produced by said recording head and moved to the recording surface are controlled so as to provide a high resolution image.

4,697,197

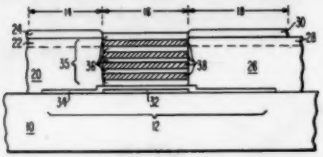
TRANSISTOR HAVING A SUPERLATTICE

Joseph Dresner, Princeton Township, Mercer County, N.J., assignor to RCA Corp., Princeton, N.J.

Filed Oct. 11, 1985, Ser. No. 786,888

Int. Cl.[4] H01L *27/12*

U.S. Cl. 357—4 **18 Claims**



1. A transistor comprising:

spaced source and drain regions with a channel region therebetween;

said channel region comprising a gate electrode, and a superlattice spaced apart by a gate insulator, said superlattice having a plurality of undoped interleaved wide and narrow bandgap layers, said layers extending between the source and drain regions.

4,697,198

MOSFET WHICH REDUCES THE SHORT-CHANNEL EFFECT

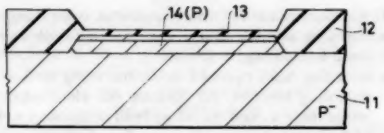
Kazuhiro Komori, Kodaira; Kenichi Kuroda, Tachikawa, and Kousuke Okuyama, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 8, 1985, Ser. No. 763,612

Claims priority, application Japan, Aug. 22, 1984, 59-173239; Jun. 21, 1985, 60-134040

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.3 **18 Claims**



17. A semiconductor device having an MIS-type field-effect transistor which is formed in a first semiconductor region of a first type of conductivity in a semiconductor substrate, and which comprises:

a gate electrode formed on a gate insulating film on a surface of said semiconductor substrate;

a source region and a drain region of a second type of conductivity formed in said first semiconductor region, one on each side of said gate electrode, each of said source and drain regions having a bottom surface, said bottom surface being the surface farthest from the semiconductor substrate surface having the gate insulating film thereon; and

a second semiconductor region which is formed in said first semiconductor region under said gate electrode, said second semiconductor region being separated from the surface of said semiconductor substrate having the gate insulating film thereon and from the bottom surface of said source and drain regions, and being contacted at one end to said source region and at the other end to said drain region, said second semiconductor region further having the same type of conductivity as said first semiconductor region and an impurity concentration higher than that of said first semiconductor region, wherein a part of said second semiconductor region extends deeper than the bottom surface of said source and said drain regions.

18. A semiconductor device according to claim 17, wherein said second semiconductor region is a region formed by a first implantation implanting impurities of first type conductivity using said field insulating film and said gate electrode as a mask, and by a second implantation implanting impurities of second type conductivity using said field insulating film and said gate electrode as a mask such that the impurities of second conductivity compensate an upper portion of said impurities of first type conductivity, wherein a portion of said second semiconductor region extends below the bottom surface of said source region and said drain region and is separated from the bottom region of said source region and said drain region by a compensated portion of said second semiconductor region, said compensated portion being a portion formed by said second implantation.

4,697,199

SEMICONDUCTOR PROTECTION DEVICE HAVING A BIPOLAR TRANSISTOR AND AN AUXILIARY FIELD EFFECT TRANSISTOR

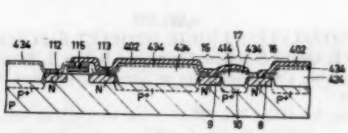
Hendrik C. De Graaff, Eindhoven, Netherlands, and Wilhelmus G. Voncken, Hamburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 765,615, Aug. 13, 1985, abandoned, which is a continuation of Ser. No. 625,183, Jun. 27, 1984, abandoned, which is a continuation of Ser. No. 332,895, Dec. 21, 1981, abandoned. This application Jul. 22, 1986, Ser. No. 889,288

Claims priority, application Netherlands, Jan. 26, 1981, 8100347

Int. Cl.[4] H01L *29/78, 27/06, 29/72*

U.S. Cl. 357—23.13 **9 Claims**



1. A semiconductor device comprising at least one circuit element and having a semiconductor body with a major surface, in which said semiconductor body comprises at least a first and a second electrode, which first electrode is connected to said circuit element, and in which a safety device is provided between said first and second elecrodes to protect the first electrode from excess voltages above a previously-determined value with respect to the voltage of the second electrode, said safety device comprising a lateral bipolar transistor having an emitter zone and a collector zone of a first conductivity type which adjoin said surface of the semiconductor body and are laterally separated, and having an adjoining base region of a second conductivity type which forms a first and a second p-n junction with said emitter zone and collector zone, respectively, an insulating layer on said surface of the semiconductor body, the base region being located between the emitter zone and collector zone and adjoining the insulating layer, first, second and third conductive layers on said insulating layer and separated thereby from said semiconductor body, the first electrode comprising said first conductive layer which is connected to the collector zone, the zone electrode comprising the second conductive layer which is connected to the emitter zone, and the third conductive layer extending above the base region between the emitter zone and collector zone, and the second junction having a breakdown voltage which is higher than the collector-emitter voltage of the lateral bipolar transistor in the conductive state, the first and third conductive layers being connectively connected together and forming parts of

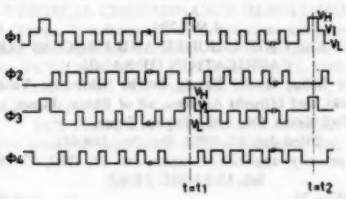
said first electrode, the third conductive layer also forming a gate electrode of an auxiliary field effect transistor structure which further comprises the emitter zone of said bipolar transistor as its source region and the collector zone of said bipolar transistor as its drain region, and the auxiliary field effect transistor structure having a threshold voltage which is lower than the breakdown voltage of the second junction and which is at least about equal to said collector-emitter voltage, said safety device comprising means including said bipolar transistor for providing a current-versus-voltage characteristic measured between the first and second electrodes having a first and a second part, the first part corresponding to a first state of relatively low current conduction of the device, which first part, with increasing voltage, extends up to a first voltage value which is higher than said collector-emitter voltage of the lateal transistor in the conductive state of said transistor, and the second part corresponding to a second state of relatively high current conduction by said bipolar transistor of the device, which second state occurs only after said first voltage value has been reached, said second part, with decreasing current, extending down to a voltage below said first voltage level, and further comprising a first zone of the second conductivity type which is located in said semiconductor body adjoining the insulating layer, is present at least locally below said layer, and is located outside the area occupied by the circuit element and outside the area occupied by the safety device, and a second surface-adjoining zone of the second conductivity type located in said semiconductor body between said emitter zone and said collector zone, said first and second zones being more highly doped than the adjoining part of the semiconductor body.

4,697,200

FIELD STORAGE DRIVE IN INTERLINE TRANSFER CCD IMAGE SENSOR

Shigehiro Miyatake, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 3, 1985, Ser. No. 688,661
Claims priority, application Japan, Jan. 10, 1984, 59-3792
Int. Cl.⁴ H01L *29/78, 27/14*
U.S. Cl. 357—24 **5 Claims**



1. A drive method for a charge coupled device (CCD) in.age sensor which includes a substrate, a plurality of PN junction photodiodes formed in said substrate and aligned in a matrix fashion, a plurality of CCD vertical shift registers formed in said substrate and associated with said plurality of PN junction photodiodes, lower electrode means formed on said CCD vertical shift registers, the lower electrode means being extended to portions provided between adjacent two photodiodes, and upper electrode means formed on said CCD vertical shift registers, the upper electrode means overlapping a portion of said lower electrode means and being extended to said portions provided between adjacent two photodiodes, the drive method comprising the steps of:

applying clock pulses having two levels V_L and V_I to both of said lower and upper electrode means in order to conduct shift operation in said plurality of CCD vertical shift registers while achieving electrical isolation between said plurality of PN junction photodiodes; and

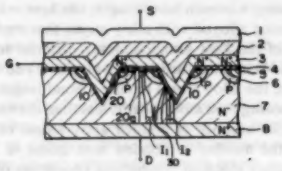
applying clock pulses having three levels V_L, V_I and V_H to said lower electrode means at a time at which charges stored in said plurality of PN junction photodiodes are transferred to said plurality of CCD vertical shift registers.

4,697,201

POWER MOS FET WITH DECREASED RESISTANCE IN THE CONDUCTING STATE

Teruyoshi Mihara, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Continuation of Ser. No. 437,357, Oct. 28, 1982, abandoned.
This application May 2, 1985, Ser. No. 729,094
Claims priority, application Japan, Dec. 18, 1981, 56-204718
Int. Cl.⁴ H01L *29/78, 27/02, 29/06*
U.S. Cl. 357—41 **16 Claims**



9. A power MOS FET comprising:

a semiconductor substrate having a substantially planar upper surface;

a drain region exposed along portions of said upper surface;

a channel forming region formed in said drain region and having an area exposed along portions of said upper surface;

a source region formed in said channel forming region and exposed along said upper surface;

a groove having inclined surfaces extending downwardly through said upper surface, said source region, said channel forming region, and said drain region, wherein said source region, said channel forming region, and said drain region are exposed along the inclined surfaces of said groove;

a gate insulating area disposed above said groove and said upper surface;

a gate electrode layer disposed above said gate insulating area, said gate electrode layer covering said area of said channel forming region exposed along portions of said upper surface.

4,697,202

INTEGRATED CIRCUIT HAVING DISLOCATION FREE SUBSTRATE

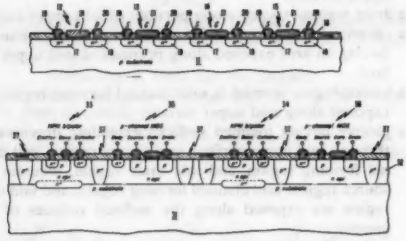
Arden Sher, Belmont, Calif., assignor to SRI International, Menlo, Calif.

Filed Feb. 2, 1984, Ser. No. 576,728
Int. Cl.⁴ H01L *29/167, 29/207, 29/227*
U.S. Cl. 357—63 **114 Claims**

1. A semiconductor circuit structure comprising a bulk substrate formed of a tetrahedral structured crystalline host semiconductor material consisting essentially of bonded host atoms bonded at least by covalent and metallic forces, the bonded atoms of the host semiconductor material nearest to each other having a known bond length, the host semiconductor material being alloyed with alloy atoms that replace some of the atoms of the host semiconductor material so that the alloy atoms and host atoms are bonded at least by covalent and metallic forces, the alloy atoms having a bond length with the nearest neighboring host atoms that is less than the known host bond length, the number of bonded alloy atoms being small compared to the number of bonded host atoms so as not to substantially affect electron conduction properties of the host material, the number of bonded alloy atoms being sufficient to virtually eliminate dislocations over a large surface area and

volume of the host material so that there is at least one atomic percent of the bonded alloy atoms in the bulk substrate, the large surface and volume of the host semiconductor material being sufficient to accommodate at least several active semiconductor devices, and at least several active semiconductor devices located on said large surface area and volume of the host semiconductor material, each of said devices having: spaced semiconductor regions forming junctions with the host material and an electrically responsive control electrode for controlling electric conduction between an adjacent pair of said spaced regions.

41. A semiconductor circuit structure comprising a bulk substrate formed of a tetrahedral structured crystalline host semiconductor material consisting essentially of bonded host atoms bonded at least by covalent and metallic forces, the bonded atoms of the host semiconductor material nearest to each other having a known bond length, the host semiconductor material being alloyed with alloy atoms that replace some of the atoms of the host semiconductor material so that the alloy atoms and host atoms are bonded at least by covalent and metallic forces, the alloy atoms having a bond length with the nearest neighboring host atoms that is less than the known host bond length, the number of bonded alloy atoms being small compared to the number of bonded host atoms so as not to substantially affect electron conduction properties of the host material, the number of bonded alloy atoms being sufficient to



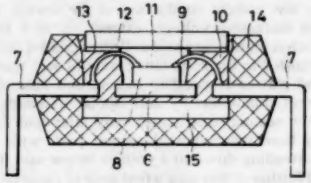
virtually eliminate dislocations over a large surface area and volume of the host material, the host semiconductor material being a pseudo binary compound of first and second types of atoms between which subsist the host material bonds having the known bond length, the alloy including third atoms of the second atom type that replace some of the atoms of the second type to form bonds with the first types of atoms having the bond length that is less than bond lengths of the atoms of the host material, the alloy being pseudo binary semiconductor compound of the first type of atom and of the third atoms, the alloy having a bond length between the first type of atoms and the third atoms less than the bond lengths of the host material between the first and second types of atoms, the host semiconductor material and the alloy semiconductor compound being different III-V compounds, the bond length of the alloyed compound being less than the bond length of the host compound, the host compound being InSb and the alloyed compound being selected from the group consisting essentially of GaSb, InP, InN and BSb, the large surface and volume of the host semiconductor material being sufficient to accommodate at least several active semiconductor devices, and at least several active semiconductor devices located on said large surface area and volume of the host semiconductor material, each of said devices having: spaced semiconductor regions forming junctions with the host material and an electrically responsive control electrode for controlling electric conduction between an adjacent pair of said spaced regions.

4,697,203

SEMICONDUCTOR DEVICE AND MANUFACTURING METHOD THEREFOR

Kunito Sakai; Sadamu Matsuda, and Takashi Takahama, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Toyko, Japan

Filed Jun. 4, 1985, Ser. No. 741,051
Claims priority, application Japan, Jun. 4, 1984, 59-115871
Int. Cl.[4] H01L *23/06, 23/30*
U.S. Cl. 357—72 **7 Claims**



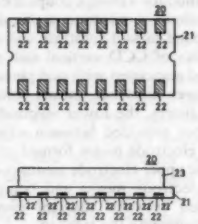
1. A semiconductor device comprising: a die pad (6) having a semiconductor chip (8) mounted on a first surface of the die pad; leads (7) separated by a gap from said die pad and connected through lead wires (9) to respective electrodes formed on a top surface of said semiconductor chip; a first, inner package number (10) of resin, said first package member forming an opening (11) above the first surface of said die pad, said resin filling the gaps between said leads and said die pad and covering a second, opposite surface of said die pad so that said semiconductor chip on said first surface of said die pad is peripherally surrounded by, but not in contact with, said first package member; an inert gas filling said opening; a second, outer package member (14) of a resin having a thermal expansion coefficient different from that of said resin forming said first package member, said second package member extending below and peripherally surrounding said first package member; and a cover member (12) sealingly closing said opening of said first package member.

4,697,204

LEADLESS CHIP CARRIER AND PROCESS FOR FABRICATION OF SAME

Tsunemasa Mita; Ryoki Katoh; Soichi Sekimoto; Yoshiyuki Shiratsuki, and Hiroshi Arisawa, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Toyko, Japan

Filed Jul. 22, 1983, Ser. No. 516,451
Claims priority, application Japan, Jul. 27, 1982, 57-131013
Int. Cl.[4] H01L *23/02*
U.S. Cl. 357—74 **3 Claims**



1. In a leadless chip carrier for carrying a chip comprising: an insulation layer having a top surface on which said chip is mounted, and a bottom surface opposing said top surface, and

a plurality of terminals spaced next to each other, said termi-

nals being disposed on said bottom surface of said insulation layer;

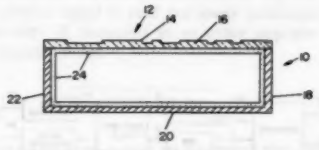
the improvement wherein said insulation layer has a plurality of recesses on said bottom surface, each of said terminals being disposed in each of said recesses.

4,697,205

HEAT PIPE

George Y. Eastman, Lancaster, Pa., assignor to Thermacore, Inc., Lancaster, Pa.

Filed Mar. 13, 1986, Ser. No. 839,087
Int. Cl.[4] H01L 23/46, 23/36, 23/14
U.S. Cl. 357—82 1 Claim



1. A combined semiconductor electronic circuit device and heat pipe comprising:

a semiconductor circuit element constructed upon an outside surface of semiconductors material, the semiconductor material also forming a wall which is part of a heat pipe casing enclosed and sealed by additional walls;

a sintered semiconductor wick structure within heat pipe casing and adjacent to the inside of the wall of semiconductor material wherein the wick structure is comprised of a sintered mixture of the same semiconductor material as the wall to which it is adjacent and up to twenty percent by weight of glass frit; and

a vaporizable liquid within the sealed heat pipe to act as the heat conducting medium.

4,697,206

METHOD AND APPARATUS FOR ENHANCING VERTICAL CHROMINANCE RESOLUTION

Gary J. Tonge, Winchester, United Kingdom, assignor to Independent Broadcasting Authority, United Kingdom

PCT No. PCT/GB84/00245, § 371 Date Feb. 27, 1985, § 102(e) Date Feb. 27, 1085, PCT Pub. No. WO85/00493, PCT Pub. Date Jan. 31, 1985
PCT Filed Jul. 9, 1984, Ser. No. 708,958
Claims priority, application United Kingdom, Jul. 8, 1983, 8318602
Int. Cl.[4] H04N 11/08
U.S. Cl. 358—14 4 Claims

1. A method of producing a color television signal in component form, comprising the steps of:

scanning a scene;

generating luminance and two types of color difference component signals representing the scene such that each luminance or color difference component signal relates to a line in one of a plurality of fields of a television display of the scene, the luminance component signals relate to every other line in one field of each frame and to every other line in the other field of each frame of the television display of the scene, said every other line in one field being interlaced with said every other line in the other field, the color difference component signals relate to every other line in each field of the television display of the scene, the color difference component signals relating to each every other line in each field alternate in type, the color difference component signals relating to lines in said one field of each frame relate to the same lines as the luminance component signals relating to said one field of each frame of the television display of the scene, the color difference component signal relating to the first line in said one field of each frame is of a different type from the color difference component signal relating to the first line of said other field of each frame of the television display, and the color difference component signals relating to the first of said every other lines in each frame are controlled to be of the same type:

time multiplexing luminance and color difference component signals to form a color television signal in component form; and

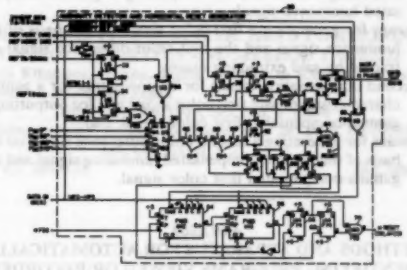
the generated color difference component signals relating to said other field of each frame of the television display relate to different lines from the luminance components relating to said other field of each frame.

4,697,207

SYSTEM FOR GENERATING A SYNCHRONIZING SIGNAL IN RESPONSE TO TWO TIMING REFERENCE SIGNALS

Martin A. Lilley, Fremont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Continuation-in-part of Ser. No. 781,545, Sep. 30, 1985, abandoned. This application Jan. 23, 1986, Ser. No. 821,630
Int. Cl.[4] H04N 9/44
U.S. Cl. 358—17 22 Claims



1. A system for generating a synchronizing signal in response to two timing reference signals each related to a different one of a plurality of timing references in a data signal wherein one of the two timing reference signals can be shifted in phase relative to the other of the two timing signals, the system comprising:

means for generating a synchronizing signal in response to coincidence between predetermined parts of the two timing reference signals;

means for detecting a condition of possible coincidence ambiguity between the two timing reference signals which can cause a significant phase change in the generated synchronizing signals;

means responsive to said ambiguity detecting means for shifting the phase of one of the reference signals by substantially 180 degreees to eliminate the coincidence ambiguity between the two signals; and

means for shifting the phase of the generated synchronizing

signal one-half cycle of the one of the reference signals in a direction to compensate for the phase shift of the one of the reference signals.

4,697,208

COLOR IMAGE PICKUP DEVICE WITH COMPLEMENTARY COLOR TYPE MOSAIC FILTER AND GAMMA COMPENSATION MEANS

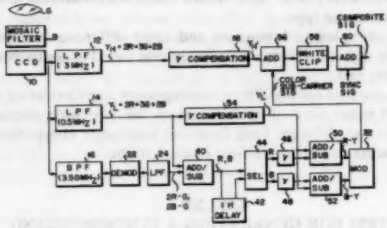
Teruo Eino, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 28, 1986, Ser. No. 868,092

Claims priority, application Japan, Jun. 13, 1985, 60-128987; Jun. 13, 1985, 60-128989; Jun. 13, 1985, 60-128990

Int. Cl.[4] H04N *9/07, 9/69, 9/73*

U.S. Cl. 358—44 **8 Claims**



1. A color image pickup device comprising:

a solid-state image sensing element having a complementary color type mosaic filter;

means for extracting a luminance signal and a first color-difference signal from an output signal of said solid-state image sensing element;

first compensation means for compensating for a gamma characteristic of the luminance signal extracted by said extracting means and for outputting a gamma-compensated luminance signal;

means for generating a first color signal on the basis of the luminance signal and the first color-difference signal extracted by said extracting means;

second compensation means for compensating for a gamma characteristic of said first color signal and for outputting a gamma-compensated first color signal; and

means for generating a second color-difference signal on the basis of the gamma-compensated luminance signal and the gamma-compensated first color signal.

4,697,209

METHODS AND APPARATUS FOR AUTOMATICALLY IDENTIFYING PROGRAMS VIEWED OR RECORDED

David A. Kiewit, Palm Harbor, and Daozheng Lu, Dunedin, both of Fla., assignors to A. C. Nielsen Company, Northbrook, Ill.

Filed Apr. 26, 1984, Ser. No. 604,367

Int. Cl.[4] H04H *9/00;* **H04N** *17/04, 17/06*

U.S. Cl. 358—84 **108 Claims**

1. A method of identifying a signal received by an audience member's television receiver for determining audience ratings comprising the steps of:

detecting the occurence of a first event in the functional operations of he audience namber's televison receiver;

detecting the occurence of a second event after the detected first event in the signal to be identified;

extracting a signature from a single frame of the video signal to be identified after the occurrence of the second event;

storing the signature and the time of occurence thereof; and

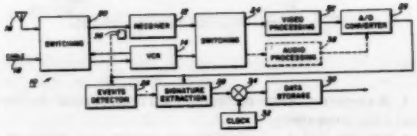
comparing the stored signature with reference signatures that occurred at approximately the same time as the stored signature.

28. A method for identifying signals for determining audience ratings comprising the steps of operating on the signal to be identified in order to extract a feature string, comparing the feature string with various feature strings corresponding to known signals and identifying the signal when the feature string of the signal to be identified correlates with one of the feature strings corresponding to a known signal within a predetermined tolerence, wherein the step of extracting the feature string from the signal to be identified comprises the steps of:

monitoring predetermined changes in a predetermined parameter of the signal to be identified;

determining the time intervals between the predetermined changes in the predetermined parameter; and

utilizing the time intervals between successive predetermined changes to generate the feature string, the feature string being a digital representation of a predefined number of said time intervals.



72. A method of identifying a television signal received from either a television receiver or a video recorder for determining audience viewing habits comprising the steps of:

detecting predetermined operational modes of the audience member's television receiver and the video recorder;

detecting the occurence of a first event in one of the operational modes;

detecting the occurence of a second event in the signal to be identified;

extracting a signature from a single frame of the video signal to be identified after the occurence of the second event; and

storing the extracted signature, the time of the signature extraction and the detected operational mode.

4,697,210

ENDOSCOPE FOR DISPLAYING A NORMAL IMAGE

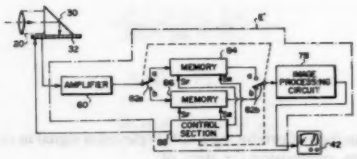
Makoto Toyota; Fumitaka Takeshita, and Satoshi Arakawa, all of Omiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Japan

Filed Aug. 16, 1985, Ser. No. 766,298

Claims priority, application Japan, Aug. 20, 1984, 59-172796

Int. Cl.[4] H04N *7/18*

U.S. Cl. 358—98 **9 Claims**



1. An endoscope wherein an insertion section provided at the forward end portion thereof with an objective optical system including a reflecting surface and a solid state imaging device is inserted into a portion of an object of interest and said portion of the object of interest is displayed on a screen of a

display unit in response to a video signal outputted from said solid state imaging device in the forward end of said insertion section, characterized in that said endoscope comprises:

a plurality of memories, into which image information obtainable from said solid state imaging device is written;

first switching means provided on the input sides of said plurality of memories for successively switching said memories with every horizontal scanning time duration;

second switching means provided on the output sides of said plurality of memories for switching said memories with every horizontal scanning time duration such that image information is read out successively from the memory, in which the write-in is completed; and

control means for writing image information into said plurality of memories in a predetermined order and for outputting a control signal to read out image information from the plurality of memories in an order opposite to the predetermined order.

4,697,211

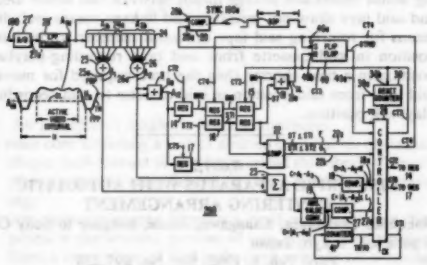
SYNC SEPARATOR WITH PERIODIC UPDATING

Alvin R. Balaban, Lebanon, and Steven A. Steckler, Clark, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Apr. 30, 1986, Ser. No. 857,320

Int. Cl.[4] H04N 5/08, 5/10

U.S. Cl. 358—153 **9 Claims**



1. A sync separator apparatus responsive to a video signal having pulses that contain synchronizing information for generating from said video signal an output signal that contains the synchronizing information, comprising:

means responsive to said video signal for generating a first signal when a given pulse occurs in said video signal that is similar in characteristic to a sync signal of said video signal, said first signal being indicative of a given level of said pulse;

means responsive to said first signal for generating a second signal that is updated upon generation of an update control signal to contain information of said level of said pulse;

means responsive to said first signal for generating said update control signal in accordance with different values of corresponding given levels of at least two occurring ones of said pulses of said video signal, said updata control signal being generated at an instant that is associated with the occurrence of said given pulse;

a timer responsive to said update control signal for generating a time-out control signal, provided a predetermined interval has elapsed from a time when said second signal has been updated, said second signal generating means being responsive to said time-out control signal for updating said second signal upon the occurrence thereof; and

means responsive to said video signal and to said second signal for generating said output signal.

4,697,212

METHOD AND APPARATUS FOR RECORDING A DIGITAL INFORMATION SIGNAL

Eiichi Osawa; Masato Tanaka; Mamoru Yoshizawa; Jun Nakai, and Yuichi Kojima, all of Shinigawa, Japan, assignors to Sony Corporation, Tokyo, Japan

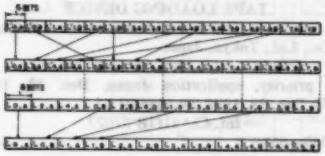
PCT No. PCT/JP84/00313, § 371 Date Feb. 15, 1985, § 102(e) Date Feb. 15, 1985, PCT Pub. No. WO85/00068, PCT Pub. Date Jan. 3, 1985

PCT Filed Jun. 15, 1984, Ser. No. 705,331

Claims priority, application Japan, Jun. 18, 1983, 58-109577

Int. Cl.[4] G11B 5/09, 5/00

U.S. Cl. 360—48 **6 Claims**



1. A method of recording a digital information signal in which a digital information signal is recorded on a plurality of parallel tracks which are formed in the longitudinal direction of a recording medium, comprising the steps of:

separating a time series of said digital information signal into a plurality of even-numbered words and a plurality of odd-numbered words; specifying in a manner such that said plurality of even-numbered and said plurality of odd-numbered words are respectively recorded on a first track group and a second track group which are separated with respect to the widthwise direction of said recording medium; and performing an error correction coding process with regard to each of said plurality of even-numbered words and said plurality of odd-numbered words.

4,697,213

INDEX SERVO TYPE MAGNETIC HEAD POSITIONING CONTROL APPARATUS AND METHOD THEREOF

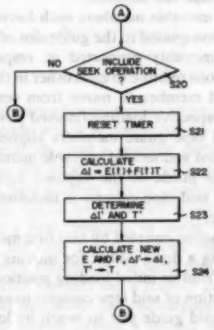
Shunji Kitamura, Hanno, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 26, 1986, Ser. No. 878,696

Claims priority, application Japan, Jun. 28, 1985, 60-142153

Int. Cl.[4] G11B 5/55, 5/56

U.S. Cl. 360—78 **16 Claims**



10. A magnetic head positioning control method using servo index data, comprising:

performing a first displacement of a magnetic head according to a first calculation of a correction current value in a designated data track position by an input seek instruction using a relation between a final correction current value and the track position;

performing a first determination of a final correction current value at the designated data track position by further displacing the magnetic head in response to a presence of a thermal off track; and

performing a second determination of the relation based on the final correction current values.

4,697,214

TAPE LOADING DEVICE

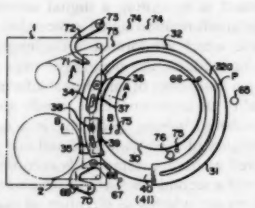
Hirotaka Sasakawa, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1985, Ser. No. 788,252

Claims priority, application Japan, Dec. 18, 1984, 59-191662[U]; Dec. 18, 1984, 59-191666[U]

Int. Cl.⁴ G11B *5/027*

U.S. Cl. 360—85 **14 Claims**



1. A tape loading device in which a tape is drawn from a tape cassette and wound on a rotary head cylinder, said device comprising:

a guide rail member formed substantially in an arcuate shape along an outer periphery of said rotary head cylinder and having a guide slot, said guide slot extending substantially along the entire length of said guide rail member and having an intermediate portion between a mounting-position end and a loading-finished end, said intermediate portion of the guide slot having an extended portion positioned obliquely outwardly relative to an outer edge of said arcuate guide rail member;

first and second movable members each having at least one engaging portion guided to the guide slot of said guide rail member and movably supported at, respectively, front and rear positions relative to each other in the guide slot of said guide rail member to move from respective initial positions to respective loading-finished positions;

first and second tape guide members aligned correspondingly to said first and second movable members and introduced into the inside of the exposed tape of said tape cassette when said tape cassette is mounted into the tape loading device;

first drive mechanism coupled by said first movable member for transmitting a drive power for moving the first movable member from its initial loading position opposed to a mounting position of said tape cassette to said loading-finished end of said guide slot to reach its loading-finished position; and

a second drive mechanism coupled with said second movable member for transmitting drive power for moving the second movable member from its initial loading position at the mounting-position end of the guide slot opposite to the mounting position of said tape cassette to the intermediate portion of said guide slot to reach its loading-finished position.

4,697,215

TAPE DRAW-OUT MECHANISM

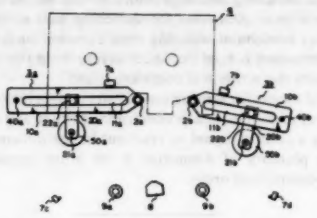
Yujiro Hata, Tokyo, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Dec. 19, 1985, Ser. No. 810,634

Claims priority, application Japan, Dec. 21, 1984, 59-269893

Int. Cl.⁴ G11B *15/665*

U.S. Cl. 360—95 **15 Claims**



1. A tape draw-out mechanism comprising a tape drawout member for engaging a tape in a cassette between a pair of reels and for drawing said tape out of said cassette into a recording-playback position and for returning said tape to said cassette, driving means for driving said tape draw-out member between an initial position in said cassette in engagement with said tape to a tape drawn-out position for recording-playback and for returning said tape to said cassette, said driving means including motor means and linkage means between said motor means and said tape draw-out member, said linkage means including means for returning said tape draw-out member to the initial position in said cassette from said tape recording-playback position in a time shorter than the time required for moving said tape from said position in said cassette to said recording-playback position.

4,697,216

DISK DRIVE APPARATUS WITH AUTOMATIC CENTERING ARRANGEMENT

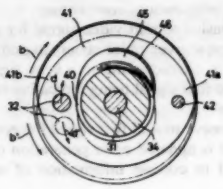
Nobuhiko Tsukahara, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 1, 1985, Ser. No. 697,236

Claims priority, application Japan, Feb. 6, 1984, 59-19648

Int. Cl.⁴ G11B *5/010, 25/04*

U.S. Cl. 360—97 **11 Claims**



1. A rotary drive apparatus for a disk having a central hole and a drive hole spaced radially from said central hole, said apparatus comprising a turntable rotatable in a predetermined forward direction, a central pin on said turntable arranged concentrically with the latter and engageable in said central hole of a disk positioned on the turntable, a drive pin engageable in said drive hole of the disk positioned on said turntable for acting against an edge of the drive hole and thereby driving the disk in said forward direction upon rotation of the turntable, means mounting said drive pin on said turntable for limited movement relative the latter in a path extending from an initial position in a direction opposed to said predetermined forward direction, of rotation, said path being increasingly distant from the center of said turntable in said direction opposed to said

predetermined forward direction, and yieldable means acting on said means mounting the drive pin for urging the latter along said path in said forward direction to said initial position, said yieldable means exerting a force on said drive pin that is less than the reaction force of said edge of the drive hole against said drive pin when the latter drives the disk so that the drive pin is displaced along said path from said initial position by said reaction force and acts radially outward against an edge of said drive hole with a force proportional to said reaction force for reliably holding the edge of said central hole against said central pin.

4,697,217

MAGNETIC HEAD HAVING A MAIN CORE OF SHEET AMORPHOUS MAGNETIC MATERIAL

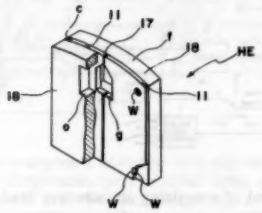
Kotaro Matsuura, Kyoto, and Kenji Oyamada, Yahata, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Oct. 13, 1983, Ser. No. 541,809

Claims priority, application Japan, Oct. 13, 1982, 57-180476; Nov. 12, 1982, 57-199266

Int. Cl.⁴ G11B *5/127*

U.S. Cl. 360—125 **3 Claims**



1. An amorphous magnetic head, comprising:

a main core including a pair of abutted core halves of similar shape, each formed of a non-laminated thin sheet of amorphous magnetic material and having a coil winding opening;

a non-magnetic spacer forming a head gap and being disposed in the abutted portion of said core halves ranging from a front edge of said main core to said coil winding opening;

a set of reinforcing cores fixed to opposite sides of said main core to hold said core halves therebetween, wherein each of said reinforcing cores is made of a laser beam transmitting glass material, each of said reinforcing cores has a coil winding opening generally corresponding to the coil winding opening in said main core, and each of said reinforcing cores has a continuous construction, such that there are no junctions therein; and

a combining means for combining said reinforcing cores and said core halves into one unit, wherein said combining means includes means for partially fusing said core halves at predetermined welding spots so as to be bonded to said reinforcing cores thereat, and wherein said amorphous magnetic head is several millimeters in length and width and several hundred microns in thickness.

4,697,218

OVERCURRENT PROTECTION DEVICE

Bernard Nicolas, Avon, France, assignor to Service National Electricite de France, Clamart, France

Filed Jul. 24, 1984, Ser. No. 633,882

Claims priority, application France, Jul. 25, 1983, 8312264

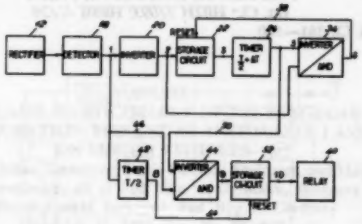
Int. Cl.⁴ H02H *3/093*

U.S. Cl. 361—87 **5 Claims**

1. Selective overcurrent protection device for AC operation, comprising:

means for rectifying the two half waves;

means for comparing the instantaneous value of the rectified current and a threshold value (s) and means for making, in the case of overshoot, a new comparison at the end of a time equal to ΔT after overshoot, T being the nominal period of the AC current and ΔT a fraction of T of the order of a tenth, said means for making a new comparison comprising memory means for storing occurrence of the overshoot, a timer of a duration equal to $(\frac{1}{2})T+\Delta T$ connected to the output of the memory means and a circuit,



comprising an inverter for each of two inputs thereof and an AND circuit driven by those two inverted inputs, whose output is connected to a reset input of the memory means and whose inputs receive, one, a signal in case of overshoot and, the other, an output signal from the timer; and,

actuating means for tripping the device if overshoot is detected during the comparison.

4,697,219

SNUBBER CIRCUIT FOR GATE TURNOFF THYRISTOR

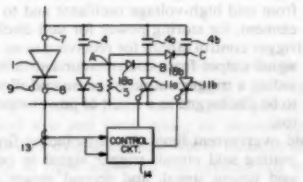
Hiroshi Mitsuoka, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1986, Ser. No. 838,835

Claims priority, application Japan, Mar. 25, 1985, 60-62485

Int. Cl.⁴ H02H *7/122*

U.S. Cl. 361—93 **5 Claims**



1. A semiconductor element having an anode, a cathode, and a control electrode which is controlled by signals applied to said control electrode, and a snubber circuit suppressing an abnormal rise in the anode-cathode voltage of said semiconductor element, said snubber circuit comprising:

a main snubber circuit having a first series connected circuit comprising a first capacitor in series with a first diode connected between the anode and the cathode of said semiconductor element in the same polarity as that of said semiconductor element and a resistor connected in parallel with said first diode for discharging said capacitor;

a sub snubber circuit having a second series circuit comprisng a second capacitor in series with a switching element and a second diode having an anode connected to a node between said first capacitor and said first diode of said first series connected circuit, and a cathode connected to a node between said second capacitor and said switching element of said second series connected circuit to discharge said second capacitor; and

a control circuit which switching said switching element of

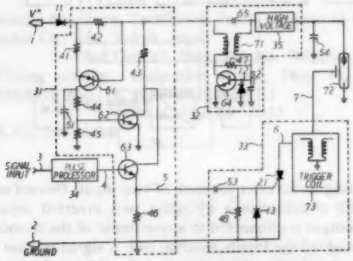
said sub snubber circuit in accordance with the amount of main current flowing through said anode and said cathode of said semiconductor element.

4,697,220

PROTECTIVE DEVICE FOR AUTO ILLUMINATION SYSTEM

Szu-Chi Chung, Taipei, Taiwan, assignor to Equus Inc., Taipei, Taiwan

Filed Mar. 18, 1986, Ser. No. 840,678
Int. Cl.[4] H02H *3/093*; H05B *41/26*
U.S. Cl. 361—100 **2 Claims**



1. A protective device in an automotive illumination system including an illumination element, said device having as inputs a voltage source for supplying power and a timing signal of variable frequency, said device comprising

an overcurrent limit circuit receiving as inputs said voltage source and said timing signal, and providing a charging current output for supplying power for providing a discharge through said illumination element and a trigger signal output for controlling when said illumination element is discharged,

a high-voltage oscillator for receiving said charging current output from said overcurrent limit circuit and for outputting a respective output,

a capacitor having one terminal connected to said output from said high-voltage oscillator and to said illumination element, for storing power for said discharging thereof,

a trigger control circuit for receiving as an input said trigger signal output from said overcurrent limit circuit and providing a trigger output to cause said illumination element to be discharged as a result of power stored in said capacitor,

said overcurrent limit circuit including first means for outputting said circuit trigger signal in correspondence to said timing signal, and second means for generating a curbing signal,

said first means including a first transistor having its base connected to receive a signal corresponding to said timing signal, said trigger signal being taken from the emitter of said first transistor, said second means including a first resistor connected between the input of said voltage source and the output of said charging current, second and third resistors connected at respective ends of said first resistor, a second transistor connected at its emitter to a second end of said second resistor and at its base connected to the same end of the first resistor as the third resistor, said second transistor having its collector connected in common to a series circuit of two further resistors and to a capacitor, said capacitor and said series circuit of two further resistors being grounded at their other end, and a third transistor having its base connected between said two further resistors, its collector connected to the second end of said third resistor, and its emitter grounded, wherein the collector of said third transistor is connected in common with the collector of said first said transistor, and

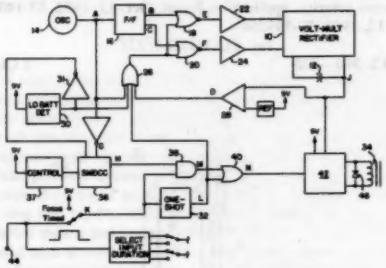
wherein said discharge occurs with a frequency equal to that of said timing signal except when said charging current becomes excessive for higher values of said frequency of said timing signal, and said curbing signal acts on said first means to interrupt the correspondence of the trigger signal with said timing signal for said excessive charging current at said higher frequency of said timing signal.

4,697,221

PORTABLE ACTUATOR FOR INDUCTIVE LOAD

Stephen T. Pasquarella, Rochester, N.Y., assignor to VA Inc., Rochester, N.Y.

Division of Ser. No. 783,156, Oct. 2, 1985, abandoned. This application Sep. 29, 1986, Ser. No. 912,644
Int. Cl.[4] H01H *47/32*
U.S. Cl. 361—156 **3 Claims**



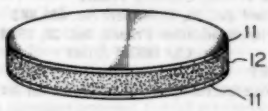
1. Method of energizing an inductive load from a battery comprising connecting a unidirectional current device across the load, and applyng timed-spaced pulses of current from the battery to the load, the sum of the pulses during any selected period being substantially less than the integrated value of the nominal holding current requirement of the load during the selected period, the inductive nature of the load causing current to continue to flow through it and the unidirectional device during the intervals between the applied pulses, the continuing current being adequate to maintain the load in its fully energized condition during the intervals, continuously sensing the output voltage of the battery, and causing the individual pulses of current to increase in duration in accordance with the extent of the drop in the output voltage of the battery from its initial value whereby the pulses become longer as the output voltage of the battery dwindles.

4,697,222

COMPOSITION FOR DIELECTRIC PORCELAIN AND DIELECTRIC PORCELAIN AND CAPACITOR BY USE OF SAID COMPOSITION

Norio Kaneko, Kashiwa, and Masahito Niibe, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1986, Ser. No. 849,825
Claims priority, application Japan, Apr. 12, 1985, 60-78771; Apr. 12, 1985, 60-78772
Int. Cl.[4] C04B *35/46*
U.S. Cl. 361—321 **12 Claims**



1. A composition for dielectric porcelain comprising

$BaTiO_3$ and 1 to 5 mole % of a compound with a molar ratio of $Bi_2O_3:RuO_2 = 1:2$ based on said $BaTiO_3$.

4,697,223

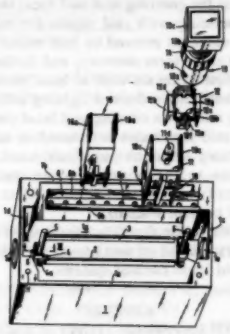
ELECTRICAL APPARATUS, PARTICULARLY APPARATUS FOR INSTALLATION

Heinz Grunst, Hubertusweg 24, and Heinz Kleine, Neue Strasse 4, both of Marienheide, Fed. Rep. of Germany

Continuation of Ser. No. 133,129, Mar. 24, 1980, abandoned. This application Jan. 8, 1987, Ser. No. 5,612

Int. Cl.[4] H02B 1/04

U.S. Cl. 361—393 4 Claims



1. An electrical component container assembly for installation of electrical components, such as signal lights, switching devices, transformers and the like, comprising a container housing; a common rail detachably mounted in said housing and being formed with a series of mounting bores; a plurality of separate mounting components each having a central part and two opposite lateral legs, said lateral legs being formed with detents and detent recesses; at least one of said mounting components having its central part provided with split dowels fitting said mounting bores in the rail, another mounting component having lateral legs of elastic material; the detents and detent recesses of the two mounting components locking into one another; the central part of said other mounting component supporting at least one of said electrical components; and arresting means secured to said housing and releasably engaging said common rail.

4,697,224

ELECTRIC DOUBLE LAYER CAPACITOR

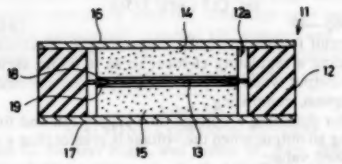
Koichi Watanabe, and Michinobu Maesaka, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 23, 1986, Ser. No. 922,278

Claims priority, application Japan, Nov. 1, 1985, 60-245347

Int. Cl.[4] H01G 9/02

U.S. Cl. 361—433 13 Claims



12. An electric double layer capacitor comprising:

a separator of electrically insulative material having ion permeability;

a pair of polarizable electrodes of solid carbonacenous material which are opposite to each other on opposite sides of said separator;

means for attaching said separator to a region of at least one of said polarizable electrodes in which said polarizable electrode faces said separator; and

a case for sealingly receiving said separator and said polarizable electrodes.

4,697,225

HEADLAMP, PARTICULARLY OF RECTANGULAR CONFIGURATION, FOR USE AS ANTIDAZZLE LAMP ON MOTOR VEHICLES

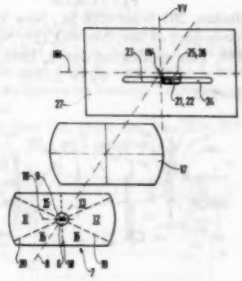
Gerhard Lindae, Leonberg; Peter Perthus, Stuttgart, and Heinz Rein, Reutlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 29, 1986, Ser. No. 893,895

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531223

Int. Cl.[4] B60Q 1/00

U.S. Cl. 362—61 4 Claims



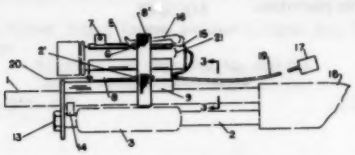
1. A headlamp of a rectangular configuration for use as an antidazzle headlamp in motor vehicles, comprising a rectangular reflector defining a vertical plane and diagonal planes of symmetry, an optical axis and focal point; an incandescent filament in the form of a cylindrical coil whose cylinder axis extends horizontally at right angles to the optical axis and whose center of gravity is located at said focal point; optical means for distributing light emitted by the incandescent filament; said reflector being divided into three pairs of diametrically opposed surface portions, the portions of a first pair extending horizontally and being delimited by intersection lines of the reflectior with the diagonal planes of symmetry, said first pair of surface portions having the shape of a sector of a first paraboloid; the surface portions of a second pair when viewed in the direction of said optical axis corresponding to upper right-hand and lower left-hand areas delimited by intersection lines of the reflector with the vertical plane and one diagonal plane, said second pair of surface portions forming together a sector of composite eliposoid-paraboloid whose vertical sections are parabolas nad horizontal sections are elipses; and the surface porions of the third pair corresponding to upper left-hand and lower right-hand areas delimited by intersection lines of the reflector with the vertical plane and the other diagonal plane, and said third pair of surface portions having the shape of a sector of a second paraboloid whose center axis is inclined upwardly relative to a center axis of said first paraboloid.

4,697,226

LIGHT MOUNTING FOR FIREARMS

Joe L. Verdin, 9203 Glen Shadow, Houston, Tex. 77088

Filed Jul. 11, 1986, Ser. No. 884,735
Int. Cl.[4] F41G *1/34*
U.S. Cl. 362—110 **4 Claims**



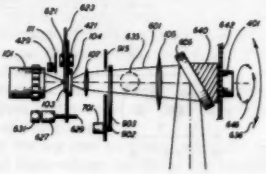
4. A light attachment for a firearm having the usual barrel and magazine in vertical parallel relation, a housing adapted to receive a flashlight, a conduit having a touch switch selectively positioned on the firearm for operation of the light, a support having ports to receive the barrel and magazine and a strap adapted to aid in maintaining the light in place, said support is secured to the housing and said housing is maintained on the top of said barrel.

4,697,227

CONTROL SYSTEM FOR VARIABLE PARAMETER FIXTURES

Michael Callahan, 201 West 85th St., New York, N.Y. 10024

Continuation-in-part of Ser. No. 443,127, Nov. 19, 1982, Pat. No. 4,527,198. This application Jul. 1, 1985, Ser. No. 750,873
Int. Cl.[4] F21V *21/00*
U.S. Cl. 362—233 **48 Claims**



1. A control system for a lighting system, said lighting system including: a plurality of light projectors, said projectors each generating a beam suitable for entertainment lighting and each of a plurality of said plurality of projectors provided with: means to vary a plurality of parameters of said beam, including the azimuth and elevation of said beam; and means to conform, said means to confrom operable from a remote location, having an input, having an output coupled to said means to vary, and cooperating with said means to vary to produce a desired adjustment of said azimuth and elevation of said beam in response to the presence of a corresponding first value set at said input, said control system comprising:

(a) at least one means for selecting a desired lighting effect to be reproduced, said means for selecting disposed at a location rerote from said projectors, having at least a first output, and capable of producing a plurality of second values at said first output, each of said second values identifying a desired lighting effect;

(b) at least one means for entering at least one of said first value sets corresponding to a desired azimuth and elevation adjustment for at least one of said projectors, said means for entering disposed at a location remote from said projector and having at least one output;

(c) a plurality of local control systems capable of operation at spaced apart locations, each of said local control systems:

i. having at least one input, said input coupled to at least said first output of said means for selecting;

ii. having at least one output for said first value sets each corresponding to a desired azimuth and elevation adjustment for at least one of said projectors, said output of said local control system coupled to said input of said means to conform o said at least one light projector;

iii. including a local short-term memory capable of storing at least five of said first value sets, each of said first value sets corresponding to the desired azimuth and elevation adjustment of said beam of at least one of said projectors in at least one desired lighting effect, each of said first value sets associated with at least one of said second values identifying a desired lighting effect;

iv. including means coupled to said at least one output of said means for entering and said local short term memory cooperating with said means for entering to store said first value set entered by said means for entering in said local short-term memory, and further for associating said first value set with at least one of said second values identifying a desired lighting effect;

v. including means for causing said local control system to produce said first value set stored in said local short-term memory at said output of said local control system in response to the presence of an associated second value identifying a desired lighting effect at said input of said local control system;

(d) at least a first means for data transmission for coupling at least said first output of said means for selecting and said inputs of said local control systems.

4,697,228

COLLAPSIBLE LIGHT WAND

Paul Y. H. Mui, and Rosa Y. M. Tso, both of 3218 Quintara St., San Francisco, Calif. 94116

Filed Sep. 15, 1986, Ser. No. 907,435
Int. Cl.[4] F21V *1/06*
U.S. Cl. 362—352 **7 Claims**

1. A collapsible light wand for attachment to a flashlight comprising:

a telescopic tube assembly comprised of a plurality of overlapping translucent cylindrical tube sections, the outermost such tube section being removably mountable to the light source end of said flashlight; and

a bar pivotally mounted to said outermost tube section to retain said tube assembly when retracted.

4,697,229

ELECTRONIC CONTROL EQUIPMENT

Peter G. Davy, Stroud, and Brian G. Cuthbertson, London, both of England, assignors to Neon 2000 Limited, London, England

Filed Feb. 5, 1986, Ser. No. 826,282
Claims priority, application United Kingdom, Feb. 8, 1985, 8503339
Int. Cl.[4] G05F *1/569*
U.S. Cl. 363—49 **10 Claims**

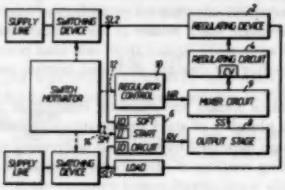
1. A circuit for automatically controlling an electrical system including a regulating element so as to avoid abrupt increases in output when the power supply is reconnected after an interruption, comprising:

means for detecting a voltage on a supply rail and for producing an output when the voltage is greater than a predetermined value;

reservoir means whose output is connected to the output of said detecting means;

level detection means whose input is connected to the output of said reservoir means and which produces an output if the reservoir level falls below a predetermined value;

and control voltage generating means having an input connected to the output of said level detection means, said control voltage generating means being adapted to generate a control voltage for the regulating element which decreases abruptly when the generating means receives an



inhibiting input and increases progressively at a predetermined rate from a low level, when the inhibiting input is removed;

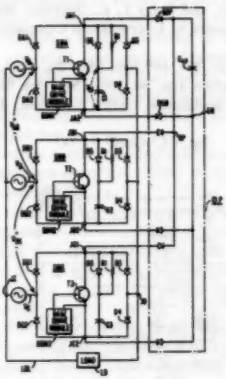
whereby the occurrance of an interruption of the supply rail voltage causes an output from the level detection means which inhibits the control voltage generating means.

4,697,230

AC POWER SUPPLIED STATIC SWITCHING APPARATUS HAVING ENERGY RECOVERY CAPABILITY

Charles L. Neft, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 23, 1986, Ser. No. 877,605
Int. Cl.[4] H02M *5/275*
U.S. Cl. 363—163 **5 Claims**



1. In a matrix converter for directly converting AC power from an AC supply to an AC load including a plurality of bilateral switches connected on respective AC phase lines, the combination of:

a common capacitor connected between opposite pole ends of each of said bilateral switches through corresponding diode means, for deriving from said pole ends current under substantially constant DC voltage; and

means connected across said common capacitor for dissipating energy accumulated in said common capacitor.

4,697,231

MACHINE CONTROL SYSTEM

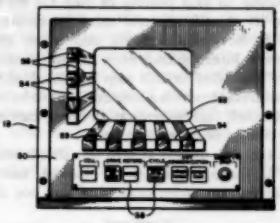
Samuel G. Boytor, Elgin, and Jeffry W. Jurs, Bloomingdale, both of Ill., assignors to F. J. Littell Machine Company, Chicago, Ill.

Filed Jun. 21, 1985, Ser. No. 747,661
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—188 **14 Claims**

7. In a machine control system of the type comprising a programmable controller, a display screen, and means for displaying any selected one of a plurality of separate screen images on the screen, the improvement comprising:

means for providing a positive check that the screen and the displaying means are operating to display the selected screen image, said check providing means comprising:

means for generating a plurality of screen image codes, each included in a respective one of the screen images such that



both the screen image and the respective one of the codes are displayed on the display screen together;

means for sensing the screen image codes and for generating a code signal in response thereto; and

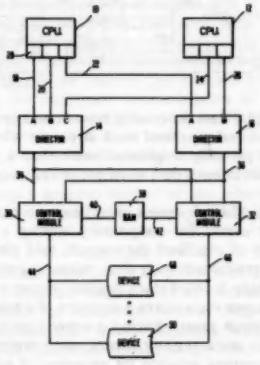
means for comparing the code signal with the screen image code for a displayed one of the screen images and for indicating any disparity therebetween to provide a positive check of the screen and the displaying means.

4,697,232

I/O DEVICE RECONNECTION IN A MULTIPLE-CPU, DYNAMIC PATH ALLOCATION ENVIRONMENT

Philip E. Brunelle, and Bob R. Southerland, both of Boulder County, Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Nov. 30, 1984, Ser. No. 676,707
Int. Cl.[4] G06F *13/14*
U.S. Cl. 364—200 **5 Claims**



2. A method of connecting a selected one of a plurality of I/O devices to a CPU through a selected path, said selected path including one of a plurality of channels originating at said CPU, a selected one of a plurality of directors connected to respective channels, a selected one of a plurality of control modules coupled to one of said directors through a control module interface, there being individual control module interfaces for coupling each director to each of a plurality of said control modules, and a device interface that connects the selected I/O device to said selected control module, said method comprising the steps of:

(1) storing in said control modules a status indication that includes a device connect ready signal from all I/O devices coupled thereto ready for connection to the CPU;

(2) simultaneously polling all control modules from one of said directors to determine if any control modules have I/O devices ready for connection;

(3) simultaneously receiving at said director a response to the poll of step (2) to identify which channels are needed to reconnect I/O devices ready for connection, and, in response thereto, polling said control modules from said one director to identify which of said control modules are connected to I/O devices that need to be reconnected via a given channel identified in this step (3);

(4) responding to said polling of step (3) by said control modules to identify control modules connected to I/O devices to be connected via said given channel, then individually interrogating each of said identified control modules identified in this step (4) to identify a specific device address to which a connection is to be made via said given channel, said interrogation being carried out under control of said one director; and

(5) connecting the device at said specific device address to said CPU through said given channel, said connection being carried out under control of said one director.

4,697,233

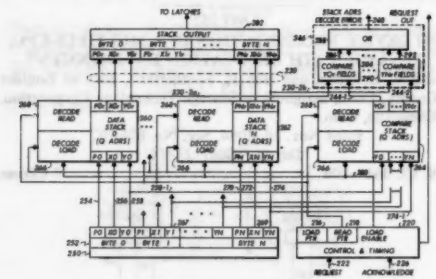
PARTIAL DUPLICATION OF PIPELINED STACK WITH DATA INTEGRITY CHECKING

James H. Scheuneman, St. Paul; Joseph H. Meyer, Lake Elmo, and Donald W. Mackenthun, Fridley, all of Minn., assignors to Unisys Corporation, New York, N.Y.

Filed Apr. 2, 1984, Ser. No. 595,864

Int. Cl.[4] G06F *11/08, 11/16, 12/00*

U.S. Cl. 364—200 **9 Claims**



1. In a digital data processing system, an improved partially duplicated virtual pipelined stack structure wherein the stack structure is partially duplicated such that a predetermined number of bits of each data word are stored in a compare stack comprising:

a plurality of stack means each having a plurality of stack register means for temporarily storing a segment of a plurality of pipelined data words, said plurality of stack means positioned such that, taken together, the correspondingly located stack register means of each of said stack means each stores a segment of a total data word;

compare stack means having a corresponding plurality of compare stack register means, each temporarily storing predetermined selected bit grouping of each of the segments of a total data word stored in corresponding registers of said plurality of stack register means;

addressing means for said stack means and for said compare stack means for addressing corresponding ones of said pluralities of said stack register means and said compare stack register means as locations;

data input means for receiving data words to be loaded;

requested receiving means for receiving request signals indicative that data words are available at said data input receiving means;

load pointer means coupled to said stack means and to said compare stack means for providing load addressing signals indicative of the selective one of said stack register means and the corresponding one of said compare stack register means at which loading is to take place;

read pointer means coupled to said stack means and coupled to said compare stack means for providing read addressing signals at which reading is to take place;

first control means coupled to said request receiving means for causing the data word stored in said data input means to be loaded in said plurality of stack means simultaneously, each at the location indicated by said load addressing signals coupled to said addressing means from said loader pointer means, and for causing the loading of a predetermined selection bit groupings of said data word in said compare stack means at the location indicated by said load addressing signals from said load pointer means, and thereafter for causing said load pointer means to be advanced;

second control means for enabling reading of data word from said plurality of stack means simultaneously, each at the location indicated by said read addressing signals, and for enabling reading of said predetermined bit groupings of said data word stored in said compare stack means from said compare stack means at the location indicated by said read addressing signals from said read pointer means, and thereafter advancing said read pointer means;

comparison means coupled to said stack means and to said compare stack means for comparing said predetermined bit groupings of said data word read from said compare stack means to corresponding bit groupings of said data word read from said plurality of data stack means for providing a first comparison signal when a first comparison condition indicative that no error condition has been detected, is detected, and for providing a second comparison signal when a second comparison condition indicative of a detected malfunction in said stack means is detected.

4,697,234

DATA PROCESSING MODULE WITH SERIAL TEST DATA PATHS

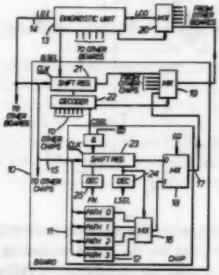
Alan Spillar, Bolton, and Peter L. L. Desyllas, Wilmslow, both of England, assignors to International Computers, Ltd., London, England

Continuation of Ser. No. 498,535, May 26, 1983, abandoned. This application Jun. 30, 1986, Ser. No. 880,302

Claims priority, application United Kingdom, Jun. 11, 1982, 8217006

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—200 **5 Claims**



1. A data processing module comprising:

(a) a plurality of serial shift register paths each having a serial input and a serial output,

(b) a serial input terminal connection in common to the serial inputs of all the shift register paths,

(c) a control shift register having an enable input and a serial input connected to the serial input terminal,

(d) means responsive to a select signal for generating an enabling signal to said enable input of said control shift register for enabling the control shift register to serially shift a control message, specifying one of the shift register paths, into the control shift register from the serial input terminal,

(e) a serial output terminal,

(f) multiplexing means, connected to said serial output terminal and responsive to said control message in the control shift register, for connecting the serial output of a selected

one of the shift register paths to the serial output terminal, and

(g) control means, responsive to said control message in the control shift register, for selecting one of the shift register paths, and to allow test data received from said serial input terminal to be shifted serially through the selected shift register path to the serial output terminal via said multiplex means.

4,697,235

LIST VECTOR CONTROL APPARATUS

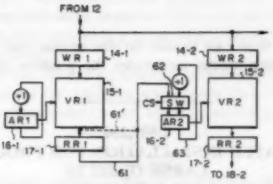
Masanori Motegi, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 20, 1984, Ser. No. 591,543

Claims priority, application Japan, Mar. 22, 1983, 58-047408; Mar. 28, 1983, 58-051887

Int. Cl.[4] G06F *15/347*

U.S. Cl. 364—200 **15 Claims**



1. A list vector control apparatus incorporated into a vector processor system comprising, at least a main memory segmented into N (where N is a positive integer equal to or larger than 2) number of banks to be accessed under an N-way interleave method, a plurality of vector registers for loading, from the main memory, successive vector elements therein, a plurality of address registers each connected to one of said vector registers, for accessing said vector elements located therein sequentially using address increment means, and a vector arithmetic unit receiving list vector data sequentially supplied from said vector registers to produce resultant data therefrom, said apparatus comprising:

one of said vector registers acting as a list vector register and storing therein a set of list vector elements supplied from said main memory;

at least one other of said vector registers acting as a list data vector register and storing therein, from said main memory, a set of vector data elements each corresponding to individual ones of said list vector elements, where said list vector elements indicate the order of the vector data elements; and

at least one list vector transfer line, connected between the address register of said list data vector register and said list vector register, the list vector elements being sequentially transferred to and momentarily stored in the address register of said list data vector register, via said list vector transfer line, and used for accessing the vector data elements in said list data vector register specified thereby, to produce the list vector data.

4,697,236

DENSITOMETER WITH AUTOMATIC GAIN AND REFERENCE VALUE ADJUSTMENT OF ANALOG WAVEFORM

Gene A. Butts; Charles D. Kelley, both of Beaumont; Henry A. Garsee, Kountze; Bruce R. Petty, Beaumont, all of Tex., and James L. Pauley, Salt Lake City, Utah, assignors to Helena Laboratories Corporation, Beaumont, Tex.

Filed Mar. 11, 1985, Ser. No. 710,741

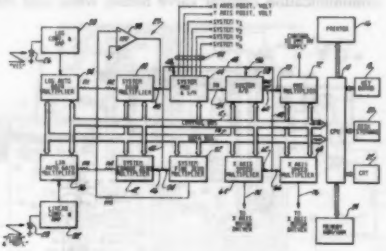
Int. Cl.[4] G06F *15/42*; G01N *33/49*

U.S. Cl. 364—416 **14 Claims**

1. In a densitometer for graphically displaying any of a plurality of different types of optical density patterns of a blood sample and of the type including the combination of means for optically scanning the sample and generating an electrical analog signal which is a function of the optical density of the scanned sample, means for amplifying the electrical analog signal, means for converting the electrical analog signal into digital sample data, means for storing the digital sample data, means for reconstructing an analog waveform representing the relevant optical density patterns of the sample using the stored digital sample data, and means for graphically displaying the analog waveform for visual inspection, the improvement comprising:

automatic adjustment means coupled to said amplifying means and to said converting means for sensing the magnitude of the generated analog signal prior to scanning and during a first scan and for automatically altering the amplification characteristics of said amplifying means in accordance with the type of optical density pattern being scanned, whereby to adjust the gain and reference level of said analog signal.

7. A method of graphically displaying any of a plurality of



different types of optical density patterns of a blood sample, comprising the steps of:

(A) Selecting the type of pattern to be displayed;

(B) Optically scanning the sample to generate a time varying, analog signal representing the optical density of the scanned sample;

(C) Storing a plurality of sets of digital data in a memory, each of said data sets being associated with one of said plurality of patterns types;

(D) Reading one of the sets of data stored in step (C) which is associated with the pattern type selected in step (A);

(E) Altering the amplitude characteristics of the analog waveform signal in accordance with the data read in step (D);

(F) Digitizing the altered analog waveform signal after performing step (E) to generate digital sample data; and,

(G) Generating a graphic display of the selected type of optical density pattern using said digital sample data.

4,697,237

VEHICLE SUSPENSION APPARATUS

Tadao Tanaka; Mitsuhiko Harara, both of Okazaki; Yasutaka Taniguchi; Masanaga Suzumura, both of Nagoya; Minoru Tatemoto, Okazaki, and Naotake Kumagai, Aichi, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 798,232

Claims priority, application Japan, Nov. 21, 1984, 59-244667; Nov. 21, 1984, 59-244668; Nov. 21, 1984, 59-244669; Dec. 25, 1984, 59-278447

Int. Cl.[4] B60G *21/06*

U.S. Cl. 364—424 **13 Claims**

1. A vehicle suspension appartus comprising:

fluid spring chambers arranged as suspension units for supporting respective vehicle wheels;

fluid supply means for supplying a fluid from each of said fluid spring chambers through exhaust control valve means;

fluid exhaust means for exhausting the fluid from each of said fluid spring chambers through exhaust control valve means;

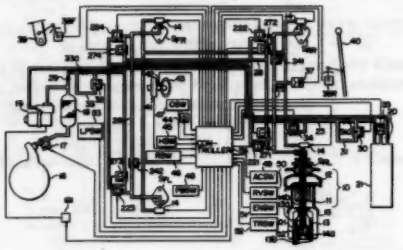
communicating means for communicating each of said fluid spring chambers of the left suspension units with each of

said fluid spring chambers of the right suspension units through communication control valve means;

steering state detecting means for detecting the steering state of a steering wheel;

roll control means for producing a second control signal for opening the desired one of said supply control valve means for a first preset time so as to supply a preset amount of a fluid to said fluid spring chambers of the contracted suspension units and opening the desired one of said exhaust control valve means for said first preset time so as to exhaust a preset amount of the fluid from said fluid spring chambers of the stretched suspension units when said steering state detecting means and vehicle velocity detecting means detect a factor with causes rolling of a vehicle body; and

communication control means for supplying a first control signal to said communicating means so as to open said communication control valve means when said steering



state detecting means detects that the steering angle falls within a preset neutral range and to close said communication control valve means when said steering state detecting means detects that the steering angle falls outside the neutral range, said communication control means supplying a third control signal to said communicating means so as to open said communication control valve means when said steering state detecting means detects, after control by said roll control means, that the steering direction of said steering wheel is in a return direction toward a neutral direction and the steering angularly velocity is higher than a first preset steering angular velocity, and said communication control means supplying a fourth control signal to close said communication control valve means for a fourth preset time when said steering state detection means detect, during a third preset time period after a second preset time from production of the third control signal, that the steering angle falls within the neutral range.

4,697,238

INTEGRATED FUEL MANAGEMENT SYSTEM

Dennis E. Barbenu, Temperance, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Division of Ser. No. 226,632, Jan. 21, 1981, Pat. No. 4,441,156. This application Feb. 10, 1984, Ser. No. 578,595

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—431.02 **9 Claims**

1. An aircraft fuel management system to regulate fuel from an airframe reservoir, said system comprising:

an aircraft turbine engine having a combustor providing propulsion for the aircraft;

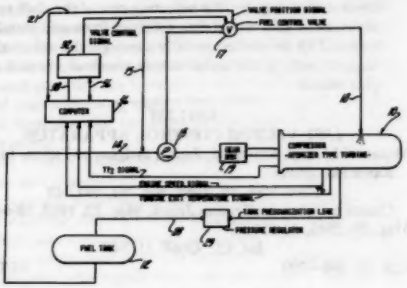
a fuel pump receiving fuel from the reservoir and supplying fuel to the turbine engine;

a motor controlling said pump so as to provide fuel to said turbine engine;

means for sensing at least one engine condition;

means responsive to said sensing means for controlling fuel flow to said turbine engine, and

wherein said pump and said motor are of the constant speed type and further comprising valve means for controlling



the fuel flow rate to said turbine engine and wherein said controlling means modulates the position of said valve means.

4,697,239

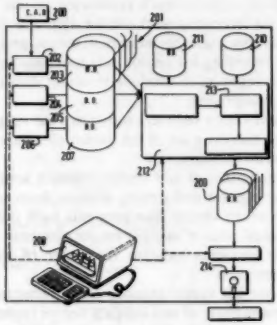
AUTOMATED INSTALLATION FOR PROCESSING LARGE OBJECTS

Claude Sicard, Saint Nazaire; Patrice Kroczynski, Vitry; Herve Gallard, Sollies-Pont; Denis Mars, Le Chesnay, and Michel Devos, Dunkerque, all of France, assignors to Institut de Recherches de la Construction Navale, Paris, France

Filed Jan. 4, 1985, Ser. No. 688,890

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—468 **16 Claims**



1. An automated mobile workshop comprising:

(a) a workstation equipped with at least one tool for performing work;

(b) means for transporting said workstation from one location to another location operably connected to said workstation;

(c) means for sensing the environment of said workstation in operable communication with said workstation for detecting the location of said workstation;

(d) a programming center for receiving and storing information relating to objects on which work is to be performed and descriptions of the capabilities of tools available to perform the work, said programming center being in electronic communication with said workstation and including:

(i) a database for receiving and storing data relating to objects on which work is to be performed;

(ii) a database provided with technical specifications for said at least one tool; and

(iii) a database containing standards for work to be performed;

(e) a supervisory station electronically connected to said programming center, said means for transporting, and said means for sensing for receiving programmed information from said programming center, detecting the presence of said at least one tool, and for communicating instructions to said means for transporting based on said programmed information;

(f) a work preparation station electronically connected to said programming center for preparing a work sequence corresponding to data relating to objects on which work is to be performed, said work preparation station including:

(i) visual simulation facilities for depicting said objects; and

(ii) a database for receiving and storing data regarding said work sequence;

(g) a database electronically connected to said supervisory station and said database for receiving and storing data regarding said work sequence for receiving and transmitting said data regarding said work sequence to said supervisory station;

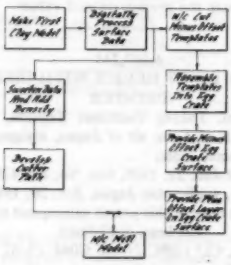
(h) a statistical control database electronically connected to said database for receiving and storing data regarding said work sequence and to said work preparation station.

4,697,240

METHOD FOR MAKING MODELS USING SIMULTANEOUS CONSTRUCTION AND CAD/CAM TECHNIQUES

Dennis A. Cedar, Troy, and Ralph L. Miller, Bloomfield Hills, both of Mich., assignors to Modern Engineering Service Company, Warren, Mich.

Filed May 28, 1985, Ser. No. 738,604
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—474 **16 Claims**


Make First Clay Model
Digitally Process Surface Data
N/C Cut Master Offset Templates
Assemble Templates Into Egg Crate
Provide Master Offset Egg Crate Surface
Provide Thin Offset Layer On Egg Crate Surface
N/C Mill Model

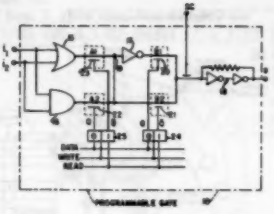
1. A method for constructing a three-dimensional master model using computer assisted design and numerical control machine tool cutter techniques, said method comprising the steps of digitally processing relatively low density surface data to obtain male template contour lines; producing a set of male templates from said contour lines, the edges of said templates being offset a first dimension below a surface on an axis normal thereto; assembling said templates into an egg crate type structure comprising spaced templates with edges generally defining a desired master model but offset below a final desired surface on an axis normal thereto; filling in spaces between said templates edges to provide a substantially continuous surface; providing a layer of millable material on said surface, said layer being of a thickness greater than said first dimension to thereby provide a rough model having a surface offset above said final desired surface on an axis normal thereto; sweetening said relatively low density surface data to provide relatively higher density surface data and then N/C milling said surface of said rough model to a desired surface using said relatively higher density surface data.

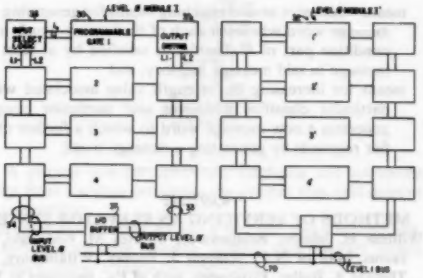
4,697,241

HARDWARE LOCIC SIMULATOR

Yoav Lavi, Raanana, Israel, assignor to Simulog, Inc., Santa Clara, Calif.

Filed Mar. 1, 1985, Ser. No. 707,040
Int. Cl.[4] G06F *15/20, 15/60;* H03K *19/088*
U.S. Cl. 364—488 **39 Claims**





1. Apparatus for verifying the design of a logic circuit composed of a plurality of interconnected logic elements comprising:

(a) a plurality of harware gates, each of which corresponds to and emulates a logic element in said circuit, each hardware gate having an output and at least two inputs;

(b) interconnnection means selectively operable for establishing a connection between the output of a given hardware gate and an input of any other hardware gate including said given gate; and

(c) multiplex means for operating said interconnection means and determining which, and when, each connection is made.

4,697,242

ADAPTIVE COMPUTING SYSTEM CAPABLE OF LEARNING AND DISCOVERY

John H. Holland, 3800 W. Huron River Dr., Ann Arbor, Mich. 48103, and Arthur W. Burks, 3445 Vintage Valley Rd., Ann Arbor, Mich. 48105

Filed Jun. 11, 1984, Ser. No. 619,349
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—513 **40 Claims**

1. A computing system comprising, in combination,

a source of input data comprising k-bit binary message words,

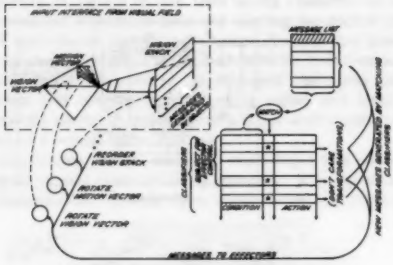
a message memory for storing said input data and additional k-bit binary message words,

a classifier memory for storing a plurality of classifiers, each of said classifiers being composed of a condition part, an action part, and a strength value,

said condition part comprising one or more k-position ternary words each of which specifies a subset of the possible k-bit binary message words, and

said action part comprising at least one k-position ternary word which at least partially specifies the content of a new message word,

matching means for comparing each message word in said message memory with the condition part of each classifier in said classifier memory,



means responsive to said matching means for generating new message word whenever each of the ternary words in the condition part of a classifier is satisfied by at least one message in said message memory, and

means for increasing the strength value associated with a particular classifier whenever said particular classifier generates a new message word to which a further classifier responds by generating a message word.

4,697,243

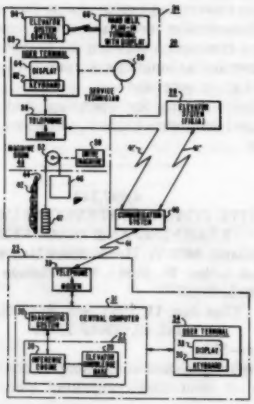
METHODS OF SERVICING AN ELEVATOR SYSTEM

William H. Moore, Bridgewater; Charles M. Gutowski, Paramus, both of N.J.; William J. Trosky, Wilkinsburg, and Thomas A. Butler, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1985, Ser. No. 758,984

Int. Cl.[4] **G06F** *11/00;* **B66B** *3/00*

U.S. Cl. 364—513 **7 Claims**



1. A method in which an expert system having a knowledge base of elevator trouble-shooting information may be used interactively, as a consultant, by any number of remotely located elevator service personnel without requiring special training in the use of expert systems, and without compromising the security of the knowledge base, comprising the steps of:

providing a knowledge base of elevator trouble-shooting information, including a rule network having rules in evidence-hypothesis format,

enabling contact to be made with said knowledge base from any number of remote elevator system locations via communication means,

limiting access to said knowledge base to authorized users,

establishing a communication link between an authorized user located at a remote elevator system and the knowledge base via the communication means,

initiating an interactive exchange session between the user and knowledge base via the communication link,

said interactive session including the steps of:

displaying an elevator system malfunction menu, selecting a symptom from the menu, and running an inference engine using the selected symptom to traverse the rule network,

asking the user to provide evidence unavailable to the knowledge base which is required to propagate belief through the rule network in an effort to determine a probable cause of the selected symptom,

said asking step including the step of providing the user with a specific code related to the evidence required by the knowledge base,

accessing the elevator system for evidence via a programmable terminal,

said accessing step including the step of entering the specific code provided to the user by the knowledge base,

said accessing step further including the step of obtaining a plurality of evidence bits from the elevator system in response to the coded entry, some of which may be immediately utilized by the knowledge base to propagate belief through the rule network and some of which may be subsequently utilized during subsequent belief propagations through the rule network,

computing the age of each of such bit of evidence before it is used by the knowledge base,

comparing the computed age with a predetermined value,

and asking the user if the evidence should be updated when the age exceeds the predetermined value.

4,697,244

COORDINATE INPUT DEVICE WITH DISPLAY AND PRINTER

Azuma Murakami, Tokyo; Yoshinori Taguchi, and Tsuguya Yamanami, both of Ageo, all of Japan, assignors to Wacom Co., Ltd., Saitama, Japan

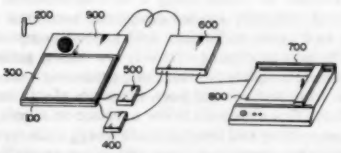
Filed Jan. 22, 1985, Ser. No. 693,429

Claims priority, application Japan, Jan. 20, 1984, 59-8920

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.[4] **G08C** *21/00;* **G06F** *15/62*

U.S. Cl. 364—520 **6 Claims**



1. A coordinate input device with display comprising:

a tablet having a plurality of X-direction magnetostrictive transmission mediums arranged in parallel, a plurality of Y-direction magnetostrictive transmission mediums arranged in parallel and superposed on said X-direction transmission mediums substantially orthogonal thereto, and first and second electromagnetic converters wound around said X and Y-direction magnetostrictive transmission mediums;

a tubular display superposed on said tablet and having a

display area substantially equal to the position detection area on said tablet;

a position appointing magnetism of generator capable of producing a magnetism just enough for causing a local increase of electro-mechanical coupling coefficient in said magnetostrictive transmission mediums in said tablet;

a position detecting circuit adapted to supply a pulse current to one of said first and second electromagnetic converters so as to generate magnetostrictive vibration wave in a reference position on each magnetostrictive transmission medium or a position appointed by said position appointing magnetism generator, said position detecting circuit being further adapted to measure the time duration between the moment at which said magnetostrictive vibration wave is generated and a moment at which said magnetostrictive vibration wave has reached the appointed position or said reference position, thereby detecting the coordinate values of the position appointed by said position appointing magnetism generator;

a display control circuit adapted for driving said display in such a manner that the position corresponding to said coordinate values is displayed on said display; and

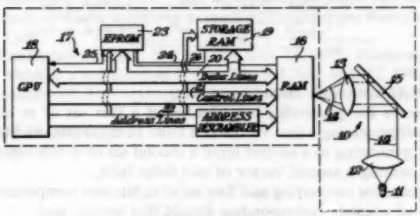
a hard copy producing means for recording the data corresponding to said coordinate values.

4,697,245

INSPECTION AND MEASURING APPARATUS AND METHOD

Gerald F. Kara, Gravette, Ark., and William H. Sawyer, Chester Springs, Pa., assignors to CBIT Corporation, Malvern, Pa.

Filed Nov. 29, 1984, Ser. No. 676,102
Int. Cl.⁴ G06F *15/46*
U.S. Cl. 364—552 **9 Claims**



1. A method for controlling dimensions of articles as conveyance is in progress by setting dimension parameters under data processor control

said method comprising

viewing a plurality of articles in an optical system and successively forming images of each article,

repetitively measuring the dimensions of the articles,

entering data of the dimensions of each article

creating and storing in a memory data of the dimension of each article,

providing a data processor with the data of the dimensions of the articles,

repetitively comparing the dimensions of the articles to create an average of the dimensions,

storing data of the average of the dimensions in said memory

monitoring conveyed articles by viewing said conveyed articles in said optical system,

ascertaining on the basis of the monitoring of the conveyed articles whether the dimensions of said articles is in accordance with said average of the dimensions,

halting the conveyance of an article when the dimensions thereof have failed to correspond to the average of dimensions.

4,697,246

METHOD AND APPARATUS FOR DETECTING THE ENGAGEMENT OF A PROPER NUMBER OF ARTICLES

Edward H. Zemke, deceased, late of Chicago by Anne H. Zemke, legal representative; Gary L. Vandersyde, Naperville; K. George Rabindran, Morton Grove, and Kenneth L. Guenther, Park Ridge, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Sep. 7, 1984, Ser. No. 648,399
Int. Cl.⁴ B25J *15/02*; G01B *5/02*; B65H *5/10, 3/32, 7/06*
U.S. Cl. 364—563 **26 Claims**

1. A gripper arm for selectively engaging and retrieving articles from a station proximate the gripper arm, said gripper arm comprising:

a gripper arm housing having a first end and a second end, said gripper arm housing having two parallel panels which define a space therebetween;

means at the second end of said housing for securing said gripper arm to oscillating drive means;

a first jaw member proximate said first end of said gripper arm housing;

a second jaw member proximate said first end of said gripper arm housing, said second jaw member being selectively movable with respect to said first jaw member for the engagement of articles therebetween;

actuation means for selectively moving said second jaw member with respect to said first jaw member whereby articles are selectively engaged between said jaw members; and,

means for detecting whether a proper number of articles are engaged between said first jaw member and said second jaw member of said gripper arm, said detecting means comprising:

means for creating a magnetic field, said magnetic field-creating means being mounted on one of saw jaw members;

Hall Effect sensor means for sensing the flux density of said magnetic field and for generating an output signal proportional thereto, said sensor means being mounted with respect to the other of said jaw members; and,

biasing means for biasing said magnetic field-creating means relative to said sensor means whereby a first plane including an essentially planar surface of said magnetic field-creating means remains in a predetermined relationship with respect to a second plane including an essentially planar surface of said sensor means in a manner whereby slidable displacement occurs between said field-creating means and said sensor means as said second jaw member is moved with respect to said first jaw member, said field-creating means and said sensor means being positioned in said space defined by said gripper arm housing panels and mounted relative to said jaw members in a manner whereby said

output signal of said sensor means is related to the distance separating said first and second jaw members as said slidable displacement occurs.

4,697,247

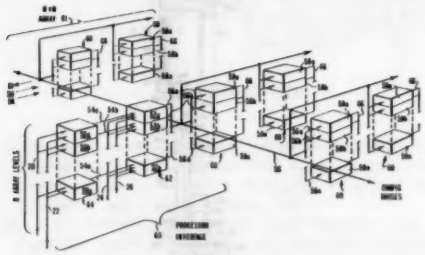
METHOD OF PERFORMING MATRIX BY MATRIX MULTIPLICATION

Jan Grinberg, Los Angeles, and Frederick G. Yamagishi, Newbury Park, both of Calif., assignors to Hughes Aircraft Company, Del.

Continuation of Ser. No. 502,981, Jun. 10, 1983, abandoned. This application Jul. 14, 1986, Ser. No. 883,437

Int. Cl.[4] G06F *7/56, 7/52;* G06G *7/16*

U.S. Cl. 364—713 **2 Claims**



1. A method of multiplying a first N×N matrix by a second N×N matrix in a parallel array digital processor, comprising the steps of:

(a) providing N^2 parallel elemental processors logically organized as a multi-level processor matrix, each one of said N^2 parallel elemental processors including a plurality of modules logically distributed over the multiple levels of said processor matrix so that each one of aid levels includes no more than one module from each processor;

(b) providing ona first level of the processor matrix a first array of N^2 memory modules, each for storing an element of the first matrix;

(c) providing on a second level of the processor matrix a second array of N^2 memory modules, each for storing an element of the second matrix;

(d) providing on a third level of the processor matrix a third array of row memory modules organized as N rows of modules, each row containing N modules intnerconnected so that all modules in the row may store in common a designated column element of the first matrix;

(e) providing a fourth level of the processor matrix a fourth array of column memory modules organized as N columns of modules, each column containing n modules interconnected so that all modules in that column may store in common a deisgnated row element of the second matrix;

(f) providing an array of N×N arithmetic modules, each for multiplying the contents of a corresponding row module from the third array of modules by the contents of a corresponding column module from the fourth array of modules;

(g) providing an array of N×N accumulator modules, each for successively summing and storing resultant multiplications from a corresponding arithmetic module;

(h) storing the elements of the first matrix in the first array of memory modules;

(i) storing the elements of the second matrix in the second array of memory modules;

(j) providing in parallel the N elments of the first column of the first matrix to the N row memory modules, whereby all of the row modules in a common row have stored therein a common element from the corresponding row of the first column of the first matrix;

(k) providing in parallel the N elements of the first row of the second matrix to the N column memory modules, whereby all of the column modules in a common column have stored therein a common element from the corresponding column of the first row of the second matrix;

(l) multiplying, in parallel, the contents of each row module by the contents of a corresponding column module to provide N×N matrix element products;

(m) accumulating, in parallel, each of the products in a corresponding accumulator module; and

(n) repeating steps (j)–(m) above for each successive column of the first matrix and correspondly successive row of the second matrix, whereby the desired matrix product is provided in the array of accumulator modules.

4,697,248

ARITHMETIC CIRCUIT FOR OBTAINING THE VECTOR PRODUCT OF TWO VECTORS

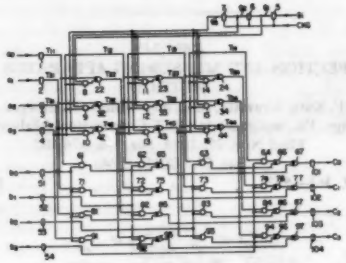
Norihisa Shirota, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 685,125

Claims priority, application Japan, Dec. 30, 1983, 58-248204

Int. Cl.[4] G06F *7/52*

U.S. Cl. 364—754 **5 Claims**



1. An arithmetic circuit comprising:

means for generating as a first input a first set of m bits representing a first vector of a finite field GF(2m) and for generating as a second input a second set of m bits representing a second vector of said finite field;

means for converting said first set of m bits into components of a matrix corresponding to said first vector; and

means for multiplying each of said components by said second set of m bits, thereby to obtain as an output a vector product of said first and second inputs.

4,697,249

METHOD AND APPARATUS FOR CREATING PART PROGRAM DATA USING A TABLET

Hajimu Kishi, Hino; Masaki Seki, Takaidonishi, and Kunio Tanaka, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Filed Feb. 28, 1983, Ser. No. 470,482

Claims priority, application Japan, Feb. 27, 1982, 57-31617

Int. Cl.[4] G06F *9/06;* G05B *19/42*

U.S. Cl. 364—900 **4 Claims**

2. An apparatus for creating part program data statements by entering points from a drawing placed on a tablet which produces coordinate values, comprising:

coordinate designating means, movable on the tablet, for designating the coordinate values and including switches for providing switch signals;

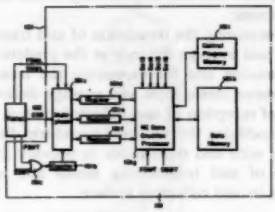
an OR gate connected to the switches of said coordinate designating means for taking the OR of the switch signals produced by each of the switches provided on said coordinate designating means;

a counter connected to said OR gate, for counting output

pulses produced by said OR gate, the status of said counter changing with each counter output pulse;

a plurality of registers for storing coordinate values successively;

a multiplexer, connected to said counter and to the tablet, for applying coordinate values, produced by the tablet, to a predetermined one of said plurality of registers in accordance with the value of the count in said counter; and



means, connected to said plurality of registers and which receives the coordinate values stored in said plurality of registers as well as information specifying part program data to be created, for creating the part program data statements using said information and said coordinate values, where the part program data statements include one of point/point sequence connection statements, point sequence connection statements, straight line definition statements and circular definition statements.

4,697,250

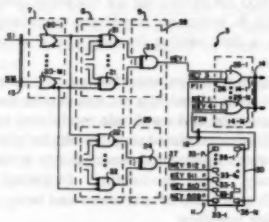
FLEXIBLE COMPUTER CONTROL UNIT

Hsiao-Peng S. Lee, Sunnyvale, and Ulrich Spannagel, Los Altos, both of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 790,270, Oct. 22, 1985, abandoned, which is a continuation of Ser. No. 525,745, Aug. 22, 1983, abandoned. This application Jun. 18, 1986, Ser. No. 876,302

Int. Cl.[4] G06F *9/02*

U.S. Cl. 364—900 **6 Claims**



1. In an integrated circuit, an apparatus connected to receive a sequence of multi-bit keys, for generating control patterns consisting of a plurality of control signals, comprising:

primary means, connected to receive the sequence of multi-bit keys, for detecting a primary set of the multi-bit keys, and for generating primary key decode signals corresponding to each of the multi-bit keys in the primary set;

alternate means, connected to receive the sequence of multi-bit keys, for detecting an alternate set of multi-bit keys, the alternate set having multi-bit keys not included in the primary set, and for generating alternate key decode signals corresponding to each of the multi-bit keys in the alternate set;

output means, connected to receive the alternate key decode signals from the alternate means, for supplying the alternate key code decode signals externally from the integrated circuit as output signals;

input means, connected to receive input signals externally supplied to the integrated circuit, for supplying the input signals internally to the integrated circuit; and

a plurality of output gates for supplying the control signals, each output gate having a primary input connected to receive one of the primary key decode signals, an alternate input connected to receive one of the input signals from the input means and an output supplying one of the control signals;

the input means and output means being adapted for communication with connection means, external to the integrated circuit and responsive to the output signals, for supplying the input signals.

4,697,251

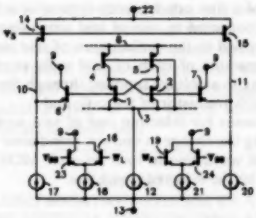
BIPOLAR RAM CELL

Mark S. Birrittella, Phoenix, and James J. Stipanuk, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 16, 1985, Ser. No. 809,551

Int. Cl.[4] G11C *11/00*

U.S. Cl. 365—154 **4 Claims**



1. A memory cell having a first bit line, a second bit line, a first word line, and a second word line, comprising:

a voltage terminal;

a first load;

a second load;

a pair of latchable cross-coupled transistors having their emitters coupled to said second word line, their collectors coupled to said first word line by said first and second loads, respectively, and their bases coupled to each other's collector;

first means coupled between said voltage terminal and said first bit line and coupled to said base of one of said pair of latchable cross-coupled transistors for sinking current from said base of said one of said pair of latchable cross-coupled transistors, wherein a voltage on said voltage terminal is greater in magnitude than the voltage on said first bit line; and

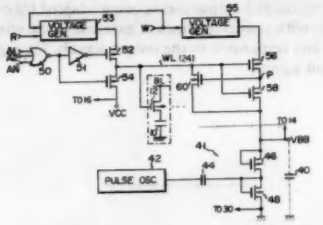
second means coupled between said voltage terminal and said second bit line and coupled to said base of the other of said pair of latchable crosscoupled transistors for sinking current from said base of said other of said pair of latchable cross-coupled transistors, wherein a voltage on said voltage terminal is greater in magnitude than the voltage on said second bit line.

4,697,252

DYNAMIC TYPE SEMICONDUCTOR MEMORY DEVICE

Tohru Furuyama, Ithaca, N.Y., and Yukimasa Uchida, Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Mar. 9, 1984, Ser. No. 587,975
Claims priority, application Japan, Mar. 10, 1983, 58-39550
Int. Cl.[4] G11C *7/00, 11/24*
U.S. Cl. 365—189 **14 Claims**



1. A dynamic type semiconductor memory device comprising:

a semiconductor substrate of a first conductivity type having a charge associated therewith;

a well region of a second conductivity type formed in the surface area of said semiconductor substrate;

charge pumping means for selectively varying the charge in said semiconductor substrate so as to reverse-bias said semiconductor substrate with respect to said well region;

a plurality of word lines;

a plurality of memory cells each including a MOS transistor and a capacitor, said MOS transistor of each of said cells being of a first conductivity type which has a gate electrode connected to one of said word lines and a current path formed in the surface area of said well region, with said capacitor of each of said cells storing data corresponding to a voltage supplied through the current path of said MOS transistor of the cell; and

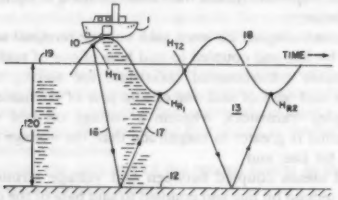
driving means for selecting one of said word lines and for applying the charge in said semiconductor substrate to the selected word line to turn on each MOS transistor connected to the selected word line.

4,697,253

SONAR HEAVE COMPENSATION SYSTEM

Earl R. Lind, Portsmouth, and Ronald A. Franklin, Newport, both of R.I., assignors to Raytheon Company, Lexington, Mass.

Filed Jan. 3, 1986, Ser. No. 816,036
Int. Cl.[4] H04B *17/00*; G01S *9/68*
U.S. Cl. 367—12 **18 Claims**



1. In combination:

means transmitting sonic energy at a predetermined time toward an energy reflecting surface which provides energy reflected from said surface;

means responsive to the energy reflected at a later time from said surface for measuring the round-trip distance between said transmitting means and said reflecting surface and between said responsive means and said reflecting surface;

said transmitting means and said responsive means moving transversely to and maintaining an average distance to said reflecting surface;

said transmitting means and said responsive means undergoing translation relative to the average distance to said reflecting surface along the direction between said reflecting surface and said transmitting means and said responsive means;

means measuring the translation of said transmitting means from said average distance at the predetermined time of transmission and for measuring the translation of said responsive means from said average distance at the later time of reception of said reflected energy; and

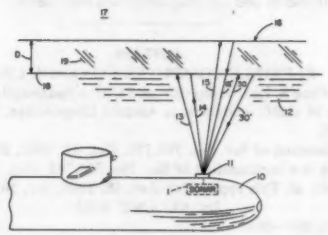
means modifying the measured round-trip distance in accordance with said translations to provide the average distance of said transmitting means and said responsive means to said reflecting surface.

4,697,254

SYSTEM AND METHOD FOR MEASURING ICE THICKNESS

Roger G. Pridham, Providence, R.I., assignor to Raytheon Company, Lexington, Mass.

Filed Jun. 2, 1986, Ser. No. 869,644
Int. Cl.[4] G01S *9/66, 9/68*
U.S. Cl. 367—92 **11 Claims**



1. A method for measuring ice thickness comprising:

generating in water an amplitude modulated sonic signal having a first carrier frequency and a modulating frequency;

generating in water an unmodulated continuous wave transmission sonic signal at a second carrier frequency at the termination of said amplitude modulated sonic signal;

said amplitude modulated signal nonlinearly interacting with said water to generated sonic energy at said modulating frequency, said modulating frequency propagating through an ice cap of said water and being reflected from an air-ice interface;

detecting the reflected first carrier frequency with its modulating frequency reflected from the ice cap-water interface;

said second carrier frequency signal also being reflected from the ice cap-water interface;

said reflected modulating frequency and said reflected second carrier frequency nonlinearly interacting in said water to generate sidebands at said modulating frequency on each side of the second carrier to provide a frequency modulated second carrier frequency;

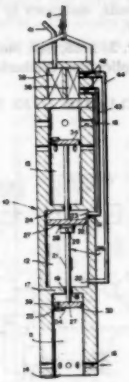
detecting said frequency modulated second carrier frequency to detect the reflected modulating frequency from said air-ice interface; and

measuring a time difference between reception of said detected first carrier frequency and said second carrier frequency thereby providing the thickness of said ice.

4,697,255
IMPLOSION TYPE ENERGY SOURCE FOR SEISMIC EXPLORATION

Donald L. Howlett, Kingwood, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jul. 11, 1986, Ser. No. 884,830
Int. Cl.[4] H04R *23/00*
U.S. Cl. 367—146 **7 Claims**



1. An acoustic energy source for use in an aqueous environment to create implosion triggered seismic impulses in a body of water which comprises

a casing having a wall defining at least two spaced apart elongated implosion chambers and a power chamber therebetween,

means forming an implosion port in a wall of said at least two implosion chambers communicating each of the latter with the surrounding body of water,

a piston rod assembly including a head 27 slidably received in said power chamber, having first and second piston heads 30 and 34 reciprocally positioned in said first and second implosion chambers for sequentially displacing water respective first and second chambers when a piston head is moved toward said implosion port to evacuate water from the implosion chamber and to permit rapid entry of water into the evacuated implosion chamber when said piston head has traversed the implosion port in said implosion chamber whereby to create a hydraulic shock, and

fluid power means communicated with said power chamber for sequentially impacting against said piston rod assembly to impart said reciprocatory movement thereto in a direction axially of the elongated implosion chambers during successive water displacing and water entry stages of the latter's operation.

4,697,256
OPTICAL DISC PLAYER WITH IMPROVED INITIAL POSITIONING OPERATION

Mitsutoshi Shinkai, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

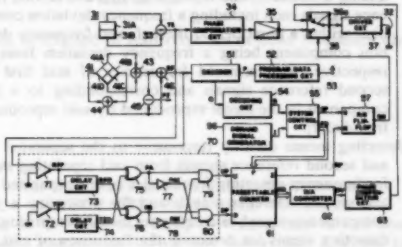
Filed Jul. 24, 1985, Ser. No. 758,335
Claims priority, application Japan, Jul. 28, 1984, 59-158344
Int. Cl.[4] G11B *7/085, 7/095, 21/08*
U.S. Cl. 369—32 **11 Claims**

7. In an optical disc player for playing an optical disc having a plurality of tracks and including optical means for transmitting an optical beam toward said optical disc and receiving a reflected light beam from said optical disc, a tracking system associated with said optical means for radially shifting said optical means to a track position at which said optical beam impinges on one of said tracks on which said data is to be recorded, and producing first and second output signals indicative of a position of said beam on said surface and varying cyclically between respective maximum and minimum values as said optical means is moved from one track position to an adjacent track position in which a method for tracking control of said optical means comprises the steps of;

detecting an initial track position of said optical means and producing an initial track position indicative signal;

receiving an input representative of a desired track position to produce a desired position indicative signal;

deriving a difference corresponsing to 4 times the number of tracks between the track position indicated by said initial track position indicative signal and the track position indicated by said desired position indicative signal and



setting an initial counter value corresponding to said difference;

driving said tracking system to continuously radially shift said optical means toward said desired position from said initial position;

detecting each time each of said first and second output signals has a predetermined value intermediate said respective maximum and minimum values;

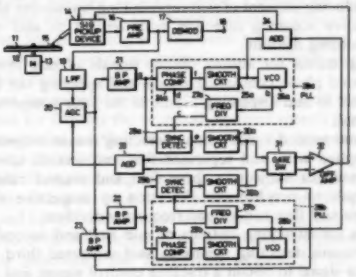
reducing said counter value in response to each said detection as said optical means shifts between said initial track position and said desired track position; and

stopping radial shifting of said optical means when said counter value becomes zero.

4,697,257
JITTER COMPENSATION SYSTEM IN A ROTARY RECORDING MEDIUM REPRODUCING APPARATUS

Hiroyuki Sugiyama, Isehara, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Continuation of Ser. No. 396,552, Jul. 9, 1982, abandoned. This application Jul. 26, 1985, Ser. No. 757,922
Claims priority, application Japan, Jul. 14, 1981, 56-109564
Int. Cl.[4] G11B *21/02*
U.S. Cl. 369—43 **3 Claims**



1. A jitter compensation system in a rotary recording me-

dium reproducing apparatus having a reproducing transducer including a reproducing element for reproducing recorded signals from a rotary recording medium, said rotary recording medium being recorded with an information signal on a track thereof and also recorded with first and second reference signals for tracking control respectively having predetermined frequencies which are mutually different, said first and second reference signals being switched over and alternately recorded between track turns for every information signal recording track turn on said rotary recording medium, and a third reference signal for indicating switching over positions of said first and second reference signals; said first and second reference signals being recorded in a burst manner with a specific repetition frequency, said jitter compensation system comprising:

separating means for separating said first, second and third reference signals from a signal reproduced by said reproducing transducer, said reproduced first and second reference signals each including a frequency deviation component within a burst period thereof, said frequency deviation component being a frequency deviation from the respective predetermined frequencies of said first and second reference signals and corresponding to a jitter component in the signal reproduced by said reproducing transducer;

detecting means directly responsive to the separated first and second reference signals from said separating means for frequency-detecting frequencies of said separated first and second reference signals and for producing a jitter compensation signal, said detecting means comprising first detecting means for detecting the frequency of said first reference signal and second detecting means for detecting the frequency of said second reference signal, said first detecting means comprising a first phase locked loop including first phase comparing means supplied with said separated first reference signal, and first oscillator means controlled of its oscillation frequency according to an output signal of said first phase comparing means for supplying a frequency substantially equal to the frequency of said first reference signal to said first phase comparing means, said second detecting means comprising a second phase locked loop including second phase comparing means supplied with said separated second reference signal, and second oscillator means controlled in its oscillation frequency according to an output signal of said second phase comparing means for supplying a frequency substantially equal to the frequency of said second reference signal to said second phase comparing means, said first and second oscillator means respectively comprising first and second voltage controlled oscillators for producing frequencies n (n is an integer) times the frequencies of said respective first and second reference signals, and first and second frequency dividers for frequency-dividing respective outputs of said first and second voltage controlled oscillators into 1/n the original frequencies and supplying frequency-divided output to said first and second phase comparing means;

displacing means responsive to the output jitter compensation signal of said detecting means for displacing the reproducing element of said reproducing transducer along a relative scanning direction with respect to said rotary recording medium;

adding means for adding output signals of said first and second phase comparing means and applying the added signal to said displacing means as the jitter compensation signal;

first and second synchronous detecting means respectively supplied with said separated first and second reference signals for subjecting these first and second reference signals to synchronous detection by respective signals from said first and second frequency dividers;

means for switching outputs of said first and second synchronous detecting means by said separated third reference signal to obtain a tracking control signal; and

means supplied with said tracking control signal for controlling the reproducing element of said reproducing transducer so as to scan over the tracks on said rotary recording medium.

4,697,258

APPARATUS FOR ENABLING AN AUTOTRACK CIRCUIT OF AN OPTICAL DISC READING APPARATUS DURING THE POSITIONING OF A READ BEAM

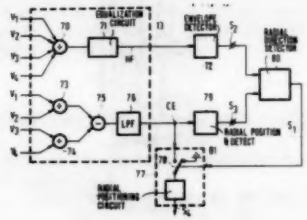
Hilde M. A. Overath, and Martinus P. M. Bierhoff, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 3, 1985, Ser. No. 719,610

Claims priority, application Netherlands, Nov. 21, 1984, 8403534

Int. Cl.[4] G11B *21/10, 7/095*

U.S. Cl. 369—44 **7 Claims**



1. An apparatus for reading a disc-shaped record carrier in which information is stored in the form of a track of optically detectable areas comprising:

a light source for producing a read beam;

an objective system for focusing the read beam to form a light spot on the record carrier;

a detection system for detecting the information present in the read beam received from the record carrier;

radial positioning means for controlling the radial position of the light spot on the information track; and,

a lock-in system for switching on the radial positioning means at an instant at which the light spot at least substantially coincides with the information track comprising means for detecting a direction of the relative radial movement between the light spot and the information track, and for supplying a first control signal to the lock-in system at substantially the instant during which when the radial positioning means is inoperative, said relative radial movement changes from an outward movement of the light spot over the track to an inward movement of the light spot over the track, whereby the radial positioning means is enabled by the first control signal.

4,697,259

DISC AUTOMATICALLY SETTING DEVICE OF A DISC PLAYER

Hiroyoshi Takanashi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 5, 1984, Ser. No. 658,226

Claims priority, application Japan, Oct. 11, 1983, 58-156944[U]; Oct. 11, 1983, 58-189601; Oct. 11, 1983, 58-189600; Oct. 11, 1983, 58-156943[U]

Int. Cl.[4] G11B *17/04*

U.S. Cl. 369—75.2 **7 Claims**

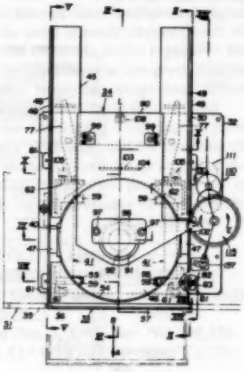
1. An automatic setting device of a disc player, comprising:

means for loading an information carrier disc, wherein the disc loading means includes a tray assembly having a disc support portion and is supported on a disc player body to be horizontally movable between an open position at which the information carrier disc is placed on the disc support portion and a shut position at which the informa-

tion carrier disc is positioned on a turntable and rotated for playback by rotating the turntable;

a clamping assembly movable between an upper limit position and a lower limit position to clamp the information carrier disc against the turntable when the tray assembly is in the shut position;

single drive means, mounted on the disc player body, for both driving the loading means and actuating the clamping assembly, wherein the drive means includes a cam member, supported in a stationary position with respect to the disc player body and having a cam portion and a first toothed portion;



a toothed member on the tray assembly and meshing with the first toothed portion of the cam member for driving the tray assembly to move between the open position and the shut position; and

a cam follower member on the clamping assembly and following the cam portion of the cam member, whereby the tray assembly and the clamping assembly are actuated by the cam member via the first toothed portion and the toothed member and via the cam portion and the cam follower member, respectively.

4,697,260

METHOD OF AND ARRANGEMENT FOR TRANSMITTING MESSAGES IN A DIGITAL RADIO TRANSMISSION SYSTEM

Christoph Grauel, Feucht; Ludwig Kittel, Heroldsberg; Werner Schmidt, Lauf-Ödenberg, and Ulrich Wellens, Heroldsberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

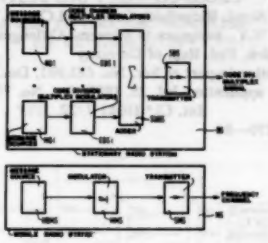
Filed Dec. 17, 1985, Ser. No. 810,439

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447107

Int. Cl.[4] H04J *9/00, 13/00;* **H04Q** *7/00*

U.S. Cl. 370—18 **13 Claims**

1. A method of transmitting messages in a digital radio transmission system comprising a plurality of stationary radio stations (BS) arranged in a cellular network and a plurality of mutually independent mobile radio stations (MS) assigned thereto, transmission of messages between a stationary radio station and its assigned mobile stations being effected over a plurality of message channels; characterized in that: transmission of messages from a stationary radio station (BS) to the respective mobile radio stations (MS) assigned thereto is effected over message channels formed by code-division multiplex modulation of such messages; the resulting code-division multiplexed messages are combined to form a wideband sum signal which is transmitted in a common frequency band; and transmission of messages from respective mobile radio stations (MS) to a stationary radio station (BS) to which they are assigned is effected in respective narrw-band frequency channels.



4,697,261

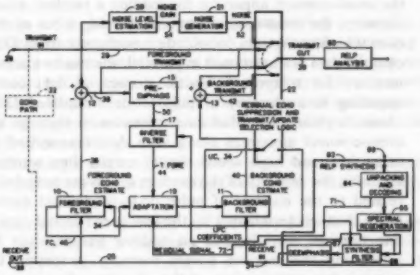
LINEAR PREDICTIVE ECHO CANCELLER INTEGRATED WITH RELP VOCODER

David T. K. Wang, and Philip J. Wilson, both of San Diego, Calif., assignors to M/A-COM Government Systems, Inc., San Diego, Calif.

Filed Sep. 5, 1986, Ser. No. 904,551

Int. Cl.[4] H04B *3/20*

U.S. Cl. 370—32.1 **28 Claims**



8. In a two-way communications network, in which a received digitized speech signal synthesized by a RELP vocoder from a residual signal received with linear prediction coefficients is echoed onto a transmit channel and combined with a transmitted digitized speech input signal that is to be analyzed by a RELP vocoder for transmission, a system for cancelling the echoed signal from the transmit channel, comprising

means for generating a foreground transmit signal by subtracting a foreground estimate of the echoed signal from the combined signal;

means for prewhitening the foreground transmit signal;

means for filtering the received digitized speech signal with adaptation coefficients to generate the foreground estimate of the echoed signal;

means for generating the adaptation coefficients by cross correlating the received residual signal with the prewhitened foreground transmit signal and adding the product of said cross correlation to the adaptation coefficients used for generating the foreground estimate of the echoed signal; and

means for providing the foreground transmit signal on the transmit channel for RELP analysis.

4,697,262

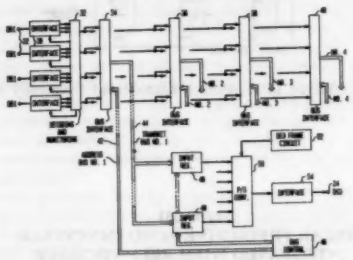
DIGITAL CARRIER CHANNEL BUS INTERFACE MODULE FOR A MULTIPLEXER HAVING A CROSS-CONNECT BUS SYSTEM

Henry P. Segal, Ridgefield, Conn., and Carl A. DeWilde, Stony Brook, N.Y., assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 683,901, Dec. 20, 1984. This application Jul. 25, 1985, Ser. No. 758,990

Int. Cl.[4] H04J *3/22, 3/12*

U.S. Cl. 370—84 **4 Claims**



1. A low speed digital carrier line terminal module for interfacing a cross-connect apparatus for cross connecting low speed digital carrier lines to either low or high speed digital carrier lines wherein said high speed digital carrier lines include data rates that are non-multiples of data rates on said low speed lines and are asynchronous to each other; including

a serial-to-parallel converter in the transmit direction toward the cross-connect apparatus for loading a random access memory, the cross-connect apparatus being a bus system over which bus system pulse code modulated carrier DSO channel data is transmitted in parallel, the random access memory for temporary, elastic storage of data corresponding to a plurality of pulse code modulated DSO channels prior to parallel data transmission through the cross-connect apparatus along with data transmitted by other low and high speed digital carrier line terminal modules, the capacity of the random access memory being related to the number of pulse code modulated carrier DSO channels terminated by the low speed digital carrier line terminal module, and an address bus receiver for addressing the random access memory, actuating the parallel data transmission of the plurality of pulse code modulated DSO channels through the cross connect apparatus; and a parallel-to-serial converter in the receive direction from the cross-connect apparatus, the parallel-to-serial converter for removing the pulse code modulated carrier DSO channel data from a random access memory and providing a serial data stream to a multiplexer for transmission over an associated digital carrier line.

4,697,263

TIME SLOT ARRANGEMENTS FOR LOCAL AREA NETWORK SYSTEMS

Raymond Beaufoy, Maidenhead, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Jul. 29, 1983, Ser. No. 518,476

Claims priority, application United Kingdom, Aug. 4, 1982, 8222529

Int. Cl.[4] H04J *3/02, 3/06;* **H04L** *7/00*

U.S. Cl. 370—85 **13 Claims**

1. A communication system comprising:

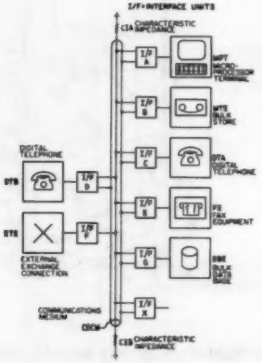
a common communication medium being arranged to carry information on a time division multiplex basis in which each time slot includes an active period for the transmission of a burst of information signals and a transit period, the communication medium having no master clocking arrangement;

a plurality of subscribers interface units each connected to the common communication medium, each interface unit includes:

a data transmission arrangement for transmitting information signals on to the communication medium;

a data reception arrangement for receiving information signals from the communication medium;

an internal timing means arranged to produce timing signals on a time division multiplex basis with each time slot including said active period and said transit period with a time slot marker at the midpoint of the transit period of each internal time slot;



means for monitoring the timing of traffic data bursts on the communication medium and generating a time slot marker relevant to the communication medium time slot for detecting a predetermined descrepancy between the transit period produced by said internal timing means and the transit period of each of the time slots on the communication medium; and

means for adjusting the internal timing means within each interface unit responsive to said means for monitoring so that the time slot timing cycle within the interface unit corresponds with that of the data signals on the communication medium.

4,697,264

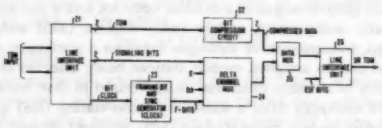
BIT COMPRESSION MULTIPLEXING

Duane Galensky, Holmdel, and Warren G. Hammett, Middletown, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 496,199, May 19, 1983, abandoned. This application Oct. 10, 1985, Ser. No. 786,292

Int. Cl.[4] H04J *3/06, 3/12*

U.S. Cl. 370—111 **7 Claims**



1. A bit compression multiplexing system for a pair of time division multiplexed digital bit streams each of which includes a plurality of PCM encoded signals in separate and distinct

channels of a repetitive frame and signaling bits multiplexed therewith comprising:

means (22) for bit-rate compressing the PCM encoded signals into differential PCM signals;

means (25) for multiplexing the compressed differential PCm signals and grouping the same into clusters, each of the clusters including predetermined number of compressed signal channels and each of the compressed differential PCM signals occupying a separate and distinct channel of a repetitive frame that includes a plurality of said clusters and a corresponding plurality of additional channels each one of which is associated with a given cluster and is proximate thereto, wherein a predetermined number of said repetitive frames forms a repetitive superframe;

means (21, 24, 25) for extracting and reformatting the signaling bits of said time division multiplexed digital bit streams and placing the same in predetermined ones of said plurality of additional channels in the repetitive frames of said superframe, the signaling bits in a given additional channel being associated with the compressed differential PCM signals of a cluster proximate thereto; and

means (23, 24) for developing a framing bit pattern for each of said plurality of clusters and for inserting the bits of the same into a predetermined bit position of the additional channel associated with an proximate to each of said clusters in the reptitive frames of said superframe.

4,697,265

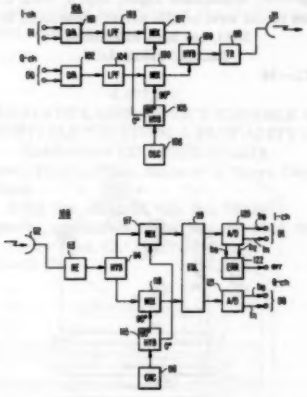
ERROR MONITOR CIRCUIT

Yoshihiro Nozue, Tochigi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 3, 1985, Ser. No. 740,326

Int. Cl.[4] G08C *25/00*; G06F *11/00*

U.S. Cl. 371—5 **16 Claims**



4. A multi-value signal error monitoring circuit for a transmitting and receiving system where data is transmitted from the transmitting side after it is converted to a multi-value signal from a specified number of bits and the data is regenerated through conversion of the multi-value signal in the receiving side, said circuit comprising:

an analog-to-digital converter for converting the multi-value signal into first bits and second bits and the first bits having a first number of bit greater than or equal to a second number of bits, the second bits corresponding to the data; and

a pseudo error rate detection and measuring circuit, operatively connected to said analog-to-digital converter, for measuring a frequency that the first bits fall in a specified range different from quantization levels of the multi-value signal.

4,697,266

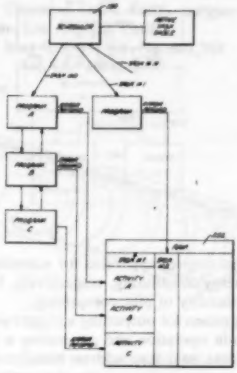
ASYNCHRONOUS CHECKPOINTING SYSTEM FOR ERROR RECOVERY

Rufus E. Finley, Yorba Linda, Calif., assignor to Unisys Corp., Detroit, Mich.

Filed Mar. 14, 1983, Ser. No. 475,154

Int. Cl.[4] G06F *11/14*

U.S. Cl. 371—12 **9 Claims**



1. In a data base management system having a plurality of application programs capable of concurrently executing a plurality of tasks with respect to a data base located in a non-volatile bulk memory, a method of providing said system with the capability of recovering from an unexpected interruption in system operation without corrupting the data base, said method comprising:

allocating a task recovery area in a random access memory during the initial processing of each task which may modify the data base;

independently recording task recovery data during the execution of each such task in its respective task recovery area to the extent required to provide recovery for the task without data base corruption in the event of an unexpected interruption in system operation while the task is executing, said independently recording task recovery data occuring in response to instructions embedded in the application programs used for executing the task;

de-allocating each task recovery area in response to deactivation of the task as a result of its successful completion;

transferring recovery data in said recovery areas to said bulk memory in response to the occurence of an unexpected interruption in system operation while a task is executing;

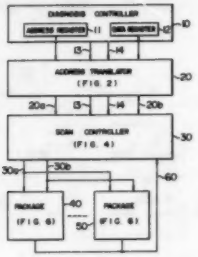
during system recovery operations, returning the recovery data transferred to said bulk memory in response to said interruption back to said task recovery areas in said random access memory; and

then independently performing task recovery operations for each task which was active when the unexpected interruption occured using the recovery data returned to its respective task recovery area, said task recovery operations being performed in a manner such that the integrity of the data base is maintained, said independently performing task recovery operations occuring in response to instructions embedded in the application programs used for executing the task.

4,697,267
SCAN CONTROL APPARATUS AND METHOD FOR DATA PROCESSING APPARATUS

Katsuro Wakai, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 20, 1985, Ser. No. 799,973
Claims priority, application Japan, Nov. 21, 1984, 59-244419
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—25 **6 Claims**



1. A scan-in control apparatus for scanning-in data to data storage elements constituting, respectively, bits of a data unit including a plurality of bits, comprising:

generating means for outputting a trigger signal for initiating the scan-in operation and generating a scan address and scan-in data, said scan address being composed of a first address section indicating the data unit to be scanned-in and a second address section designating a bit in said data unit;

scan control means connected to said generating means for responding to said trigger signal to thereby output a control signal for controlling the scan-in sequence;

register means for holding data;

scan-in means connected to said scan control means for responding to said control signal to thereby connect selectively a plurality of the data storage elements constituting the data unit designated by said first address section of said scan address to said register means for effecting the scan-out of data to said register means from said plurality of the data storage elements and the scan-in of data to said plurality of the data storage elements from said register means;

reset means connected to said scan control means for responding to said control signal to reset the plurality of data storage elements for the data unit designated by said first address section of said scan address; and

set means connected to said scan control means for responding to said control signal to set said scan-in data at the bit position of said register means designated by said scan address.

4,697,268
DATA PROCESSING APPARATUS WITH MESSAGE ACCEPTANCE MONITORING

Peter L. L. Desyllas, Wilmslow; Nicholas P. Holt, Hadfield, and Finbar Naven, Cheadle, all of England, assignors to International Computers Limited, London, England

Filed Aug. 29, 1985, Ser. No. 770,745
Claims priority, application United Kingdom, Sep. 4, 1984, 8422328
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—67 **9 Claims**

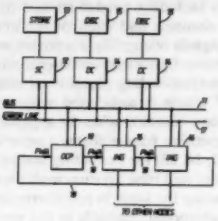
1. Data processing apparatus comprising:

(a) a plurality of data processing units, and

(b) a bus interconnecting the units for broadcasting public write messages from any one of the units to the other units parallel, wherein the improvement comprises

(i) a plurality of acceptance lines connecting the units together in a loop,

(ii) means in each said unit for detecting a public write message on the bus and sending an acceptance signal over the acceptance line to the next unit in said loop, and

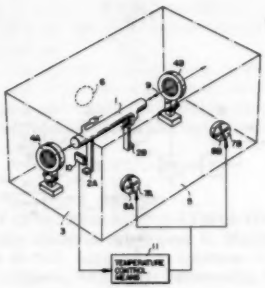


(iii) means in each said unit for monitoring the acceptance line from the preceding unit in said loop and for producing an error signal whenever a public write message detected but no corresponding acceptance signal is received, and whenever an acceptance signal is received without any corresponding public write message.

4,697,269
LASER APPARATUS

Yuji Ohara, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed Aug. 31, 1983, Ser. No. 528,250
Claims priority, application Japan, Sep. 3, 1982, 57-153539
The portion of the term of this patent subsequent to Feb. 25, 2003, has been disclaimed.
Int. Cl.[4] H01S *3/04*
U.S. Cl. 372—34 **6 Claims**

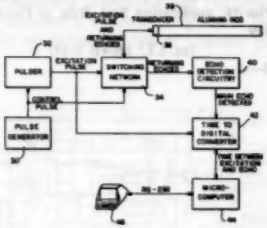


1. A laser apparatus for generating a laser beam comprising a hollow case having sidewalls, a laser beam generating means including a laser tube having an axis, a pair of external mirrors positioned along said laser tube axis and a support plate, said laser tube and said pair of external mirrors being connected to and supported by said support plate, said laser beam generating means being positioned within said case, and said apparatus further including temperature detecting means and temperature control means for controlling the temperature of the atmosphere within said case, a cooling fan disposed at a position corresponding to each external mirror at an end portion of said laser tube, and an air inlet formed in said case at a position substantially corresponding to a middle portion of said laser tube.

4,697,270
COPPER VAPOR LASER ACOUSTIC THERMOMETRY SYSTEM

Joseph J. Galkowski, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 27, 1986, Ser. No. 900,860
Int. Cl.⁴ H01S *3/04*
U.S. Cl. 372—34 **12 Claims**



1. A thermometry system for a laser comprising:

alumina rod means for axially coupling an acoustic pulse a predetermined distance from a coupling point into the interior of said laser such that an echo pulse corresponding to said acoustic pulse is reflected from the interior of said laser to said coupling point without affecting operation of said laser,

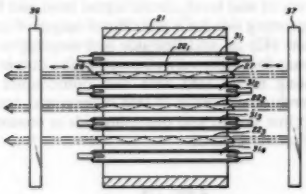
means for measuring a period of time between the coupling of said acoustic pulse and the return of said echo pulse to said coupling point, and

means for processing the measured time difference to provide a temperature indication at the predetermined interior point within said laser.

4,697,271
SOLID-STATE LASER DEVICE CAPABLE OF EFFECTIVELY EXCITING A PLURALITY OF SLAB-SHAPED LASER MEDIA

Satoru Amano, Tokyo, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Sep. 30, 1985, Ser. No. 782,065
Claims priority, application Japan, Sep. 29, 1984, 59-203002
Int. Cl.⁴ H01S *3/14*
U.S. Cl. 372—68 **7 Claims**



1. A solid-state laser device, comprising:

a reflector member having an internal reflection surface which defines an internal prismal space, and a pair of partial reflection surfaces opposite to each other;

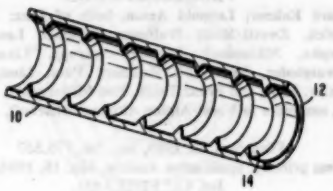
a plurality of slab-shaped laser media arranged from a first endmost laser medium to a second endmost laser medium in said internal prismal space, with at least one internal gap left between two adjacent ones of said plurality of slab-shaped laser media and with two additional gaps left between one of said partial reflection surfaces and said first endmost laser medium, and between the other of said partial reflection surfaces and said second endmost laser medium; and

exciting members disposed in each of said at least one internal gap and in said two additional gaps for directly optically exciting said two adjacent ones of the slab-shaped laser media together with said first and said second endmost laser media.

4,697,272
CORRUGATED REFLECTOR APPARATUS AND METHOD FOR FREE ELECTRON LASERS

Robin J. Harvey, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 9, 1986, Ser. No. 861,764
Int. Cl.⁴ H01S *3/08*
U.S. Cl. 372—99 **16 Claims**



1. A corrugated reflector apparatus for coherent reflection of the power in a wave, comprising;

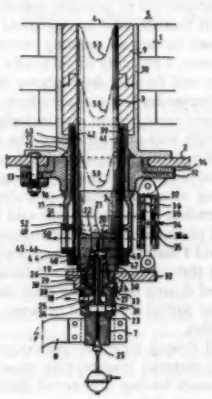
a hollow cylindrical member having a longitudinal axis, and

a plurality of blazed vane means, coaxially disposed internally within said member along said axis, for coherently reflecting power of said wave at a specified wavelength.

4,697,273
ELECTRODE STRUCTURE FOR A BATH OF MOLTEN METAL

Jean Cordier, Saint-Saulve, France, assignor to Union Siderurgique du Nord et de l'Est de la France (USINOR), Puteaux, France

Filed Sep. 30, 1985, Ser. No. 781,550
Claims priority, application France, Oct. 1, 1984, 84 15065
Int. Cl.⁴ H05B *7/00*
U.S. Cl. 373—72 **15 Claims**



1. An electrode structure in combination with a vessel having a wall and an inner refractory lining lining said wall, for a bath of molten metal, the electrode structure being embedded

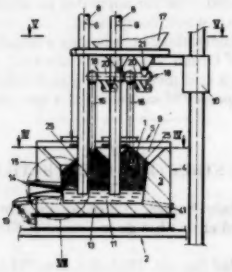
in the refractory lining, flush at one end of the electrode structure with an inner surface of said refractory lining and projecting adjacent an opposite end out of the vessel, said electrode structure comprising a central electrically conductive core extending through said wall of the vessel and a cooling jacket disposed around said central core and in close contact therewith, and an electric supply terminal directly connected to the end of the central core outside the vessel, the improvement comprising said central core having electrical insulating means arranged between said central core and said cooling jacket in a zone adjacent to the outer end of said central core connected to the electric supply terminal.

4,697,274

ELECTRIC MELTING FURNACE ARRANGEMENT AS WELL AS A METHOD OF INFLUENCING THE COMPOSITION OF A MINERAL MELT FOR PRODUCING WOOL

Bernhard Enkner; Leopold Amon, both of Linz; Alfred Kübelböck, Zwettl/Rodl; Wolfgang Trimmel, Leoben; Paul Nalepka, Niklasdorf; Leopold Schropp, Linz; Helmut Schwaighofer, Neumarkt; Reinhard Pum, Linz; Manfred Traxler, Hart, and Franz Tasch, Bad Mitterndorf, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Sep. 13, 1985, Ser. No. 775,537
Claims priority, application Austria, Sep. 18, 1984, 2964/84
Int. Cl.[4] F27D *3/00*
U.S. Cl. 373—79 **9 Claims**



1. In an electric furnace arrangement for continuously melting mineral fine-particle or granular materials capable of being spun from melt thereof, said arrangement including a refractory lined vessel having an opening covered by a lid, a side wall and a bottom, a plurality of vertically movable electrodes extending into said furnace from above through openings in said lid, said electrodes being spaced from each other along a partial circle, said arrangement also including means for charging said materials into said furnace to be melted and tapping means extending through the side wall thereof for discharging molten material from said furnace, the improvement wherein:

said charging means includes a plurality of spaced dosing pipes extending from above into said furnace,

each of said pipes having a material-receiving opening at its top end and a material discharge opening at its bottom end extending through the lid of said furnace,

said spaced dosing pipes being each disposed closely adjacent said partial circle and between two of each of said electrodes,

each of said dosing pipes having cooperatively associated therewith material transporting means in the form of a channel, each having a material discharge end disposed above the material-receiving opening of each of said dosing pipes,

whereby during charging of said furnace, said dosing pipes are maintained filled, the material-receiving opening of each of said dosing pipes being characterized in that when full, the material forms an upwardly directed conical pile which used as an indication for interrupting the further discharge of material to the pipes,

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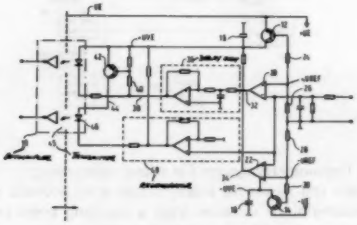
4,697,275

RECEIVING CIRCUIT FOR SIGNAL TRANSMISSION SYSTEMS

Hans-Bodo Laue, Altenbeken, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Aug. 13, 1985, Ser. No. 765,285
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430339
Int. Cl.[4] H04B *9/00*
U.S. Cl. 375—4 **7 Claims**



1. A receiving circuit for an electrical signal transmission system employed to regenerate a level control electrical signal from an input bipolar electrical signal, comprising:

an operating side for delivering the regenerated electrical data signal and a receiving level electrical control signal;

a line side having an input for receiving said bipolar signal;

an optocoupler device (**10**) for electrically isolating said line side from said operating side and for transferring said data signal and said level control signal from said line side to said operating side;

a pair of comparators (**20,22**) on said line side for respectively establishing positive and negative receiving thresholds for said bipolar input signal, including a pair of outputs (**32,34**) for generating said level control signal;

regenerating means (**48**) on said line side for regenerating said data signal, said regenerating means including an input for receiving said received data signal and an output for outputting the regenerated data signal;

delay means (**36**) on said line side and coupled with the outputs (**32,34**) of said comparators (**20,22**) for delaying the delivery of said level control signal from said line side to said operating side for a preselected length of time; and

switch means (**42**) on said line side and responsive to said delay means for selectively connecting the output of said regenerating means (**48**) with said optocoupler device (**10**), whereby the transfer of said regenerated data signal from said line side to said operating side is controlled by said level control signal.

4,697,276

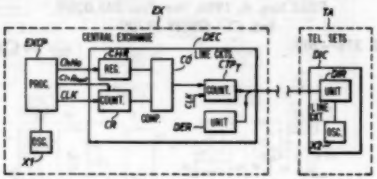
APPARATUS FOR SYNCHRONIZING PULSE TRAINS IN A DIGITAL TELEPHONE SYSTEM

Karl I. L. Skoog, Farsta, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

PCT No. PCT/SE85/00010, § 371 Date Sep. 10, 1985, § 102(e) Date Sep. 10, 1985, PCT Pub. No. WO85/03181, PCT Pub. Date Jul. 18, 1985
PCT Filed Jan. 11, 1985, Ser. No. 777,695
Claims priority, application Sweden, Jan. 13, 1984, 8400170-0
Int. Cl.[4] H04L *7/00*
U.S. Cl. 375—114 **9 Claims**

1. A method for synchronizing pulse trains in a digital telephone system including an exchange (EX) and a plurality of

telephone sets (TA) connected to the exchange via lines, the exchange including a central processor (EXCP) and a plurality of line circuits (DEC), each of the telephone sets including a separate line circuit (DIC), each of said line circuits (DEC) and (DIC) having reception and transmission directions and including a primary counter, a time position counter, and a synchronizing detector (SD) which detects, in the reception direction of the line circuits, the reception of a synchronizing window containing at least two consecutive synchronizing bits of opposing polarity preceded by a plurality of logical Zeros, said method comprising generating and transmitting to the synchronizing detector a synchronizing signal consisting of said consecutive synchronizing bits of opposite polarity preceded by said plurality of logical Zeros, transmitting during the duration of the first of the synchronizing bits a zero resetting signal to said primary counter (CTR), feeding a high frequency signal to the primary counter and in the primary counter dividing the high frequency signal down and sending a resulting control signal of lower frequency to the time position counter (CTP), sending the zero resetting signal also to said counter (CTP), and utilizing the change between said first and said second synchronizing bits to cause the zero resetting of the counters (CTR) and (CTP) to take place rapidly due to the steep derivative of the transition between the synchronizing bits, whereupon the counters resume counting in a precisely defined manner enhancing synchronization.

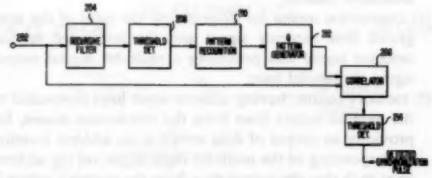


4,697,277

SYNCHRONIZATION RECOVERY IN A COMMUNICATIONS SYSTEM

William F. van Rassel, Ontario, Canada, assignor to Scientific Atlanta, Inc., Atlanta, Ga.

Filed Feb. 21, 1985, Ser. No. 704,024
Int. Cl.[4] H04L 7/00; H04N 7/00
U.S. Cl. 375—116 **13 Claims**



1. A method of detecting a synchronizing signal encoded as m identical first code patterns (P) followed by n identical second code patterns (Q), each of the first and second code patterns being of the same predetermined duration as, and in phase with, each other, the first code pattern (P) being different from the second code pattern (Q), where m and n are positive real numbers and m is greater than one, said method comprising the steps of:

receiving the encoded synchronizing signal;

identifying an occurence of the first code pattern (P) in the received signal;

locally generating, in a predetermined phase relationship with the identified occurence of the first code pattern, a plurality of representations of either the first code pattern or the second code pattern;

comparing the received signal with the locally generated representations; and

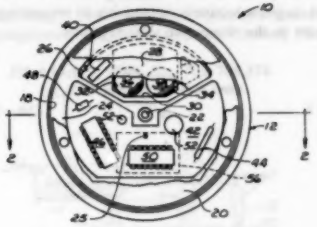
detecting a change in the comparison as the synchronizing signal.

4,697,278

ELECTRONIC HUB ODOMETER

Donald W. Fleischer, Wethersfield, Conn., assignor to Veeder Industries Inc., Hartford, Conn.

Filed Mar. 1, 1985, Ser. No. 707,073
Int. Cl.[4] G01C 22/00
U.S. Cl. 377—24 **20 Claims**



1. An electronic hub odometer comprising:

a housing adapted to be mounted for rotation with a vehicle wheel;

a magnet mounted in fixed position relative to said housing and rotatable therewith;

magnetic sensor means responsive to said magnet to detect a revolution of said wheel and produce a revolution signal indicative thereof;

clock means to generate clocking signals;

data means responsive to said revolution and clocking signals to produce data indicative of distance of travel of said wheel for a series of pre-established time intervals;

memory means to store said data;

transmitter means selectively actuable to transmit said data in electromagnetic waveform from said memory means for remote readout; and

mounting means pivotally suspended within said housing to mount said magnetic sensor means, said clock means, said data means, said memory means and said transmitter means.

4,697,279

TEST/MASTER/SLAVE TRIPLE LATCH FLIP-FLOP

James J. Baratti, Los Angeles; Mike McCollough, Inglewood, and Glenn P. Gouzoules, El Segundo, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 4, 1985, Ser. No. 794,931
Int. Cl.[4] G11C 19/00
U.S. Cl. 377—73 **32 Claims**

1. A shift register stage for large-scale integrated and very large-scale integrated circuits, comprising:

first latching means responsive to a first clock signal and a data input for providing a first data output;

control means responsive to a control signal, said first data output and a second data input for providing as a controlled data output a replica of said first data output or a replica of said second data input as a function of the control signal;

second latching means responsive to a second clock signal and said controlled data output for providing a second data output; and

third latching means responsive to a third clock signal and said second data output for providing a third data output.

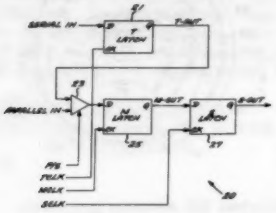
19. An integrated circuit structure comprising:

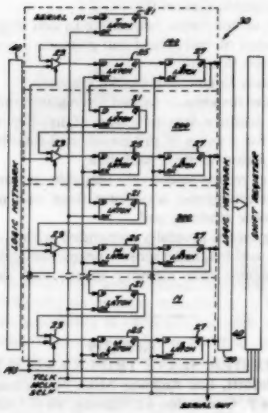
a first shift register having a plurality of cascaded shift register stages, including a first stage and a last stage, for receiving respective parallel inputs and for providing said parallel inputs as respective parallel outputs;

a logic network for receiving said parallel outputs of said first shift register and for providing logic network outputs in response thereto;

a second shift register having a plurality of cascaded shift register stages, including a first stage and a last stage, for receiving said logic network outputs as respective parallel inputs and for providing said parallel inputs as respective parallel outputs;

respective first latching means for each shift register stage responsive to serial data and for providing respective first data outputs, said first latching means of the respective first stages selectively responsive to respective serial data inputs to the respective shift registers,





respective control means for each shift register stage responsive to said respective first data outputs and to respectively associated shift register parallel inputs and for providing as respective controlled data outputs (a) replicas of said respective first data outputs or (b) replicas of said respectively associated shift register parallel inputs, as a function of a control signal;

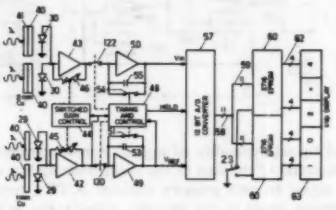
respective second latching means responsive to said respective controlled data outputs and for providing respective second data outputs; and respective third latching means responsive to said respective second data outputs and for providing respective third data outputs, said respective third data outputs being selectively provided (a) in parallel as respective shift register parallel outputs, or (b) as respective serial data to any subsequent respective first latching means in the shift register, whereby the third data output of the last shift register stage selectively provides a serial data output of the shift register.

4,697,280

METHOD AND APPARATUS FOR THE MEASUREMENT OF X-RAY SOURCES

William C. Zarnstorff, and Frank N. Ranallo, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sep. 6, 1984, Ser. No. 648,020
Int. Cl.[4] G01D *18/00*
U.S. Cl. 378—207 **26 Claims**



1. Apparatus for the measurement of the characteristics of an X-ray beam from an X-ray machine comprising:

(a) first detector unit means for providing an output signal related to the intensity of the X-ray radiation incident on it which passes through an X-ray filter of a first attenuation characteristic;

(b) second detector unit means, adjacent to the first detector unit means, for providing an output signal related to intensity of the X-ray radiation incident on it which passes through an X-ray filter of a second attenuation characteristic different than that of the X-ray filter for the first detector unit means;

(c) first integrator means for integrating the signal from the first detector means and providing an output signal indicative thereof;

(d) second integrator means for integrating the signal from the second detector means and providing an output signal indicative thereof;

(e) conversion means for determining the ratio of the integrated first detector signal and the integrated second detector signal and providing a multi-bit digital output signal on parallel lines;

(f) memory means, having address input lines connected to the parallel output lines from the conversion means, for providng an output of data stored at an address location corresponding to the multi-bit input signal on the address lines such that the output data from the memory means is indicative of a selected characteristic of the X-ray beam received by the first and second detector unit means;

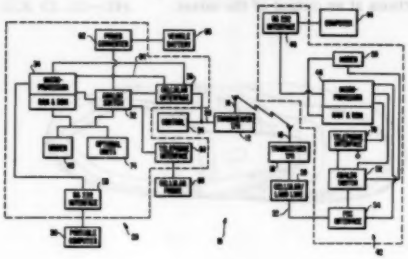
(g) display means for receiving the output data signal from the memory means and for providing a display to an operator which corresponds to the data from the memory means; and

(h) timing and control means for determining when the magnitude of the output signal of the first integrator means exceeds a predetermined level and thereafter holding the output signal levels of the first and second integrator means constant to allow such levels to be readily compared by the conversion means to determine a ratio output signal which remains substantially constant.

4,697,281
CELLULAR TELEPHONE DATA COMMUNICATION SYSTEM AND METHOD

Harry M. O'Sullivan, Red Oak, Tex., assignor to Spectrum Cellular Communications Corporation, Inc., Dallas, Tex.

Filed Mar. 14, 1986, Ser. No. 839,564
Int. Cl.[4] H04M *7/04*
U.S. Cl. 379—59 25 Claims
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 75 Pages)

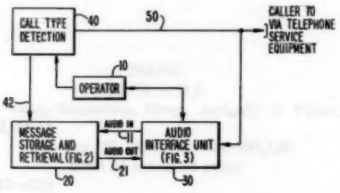


1. A method for transmitting data from a transmitting station over a cellular telephone system to a receiving station by means of a modem connected to said cellular telephone system which is operative in an activated state to modulate a carrier signal for said cellular telephone system with a data signal, said method including the steps of placing said modem in the activated state, providing a data signal to said activated modem, maintaining said modem in the activated state for a predetermined time period after a loss of said carrier signal before permitting said modem to deactivate, and causing said modem to remain in said activated state after the loss of said carrier signal if said carrier signal resumes within said predetermined time period.

4,697,282
TELEPHONE OPERATOR VOICE STORAGE AND RETRIEVAL SYSTEM

Walter W. Winter, Melbourne; Steven E. Gothard, Palm Bay, and John H. Drew, Indialantic, all of Fla., assignors to Golden Enterprises, Inc., Melbourne, Fla.

Continuation of Ser. No. 601,711, Apr. 18, 1984, Pat. No. 4,623,761. This application Jun. 20, 1986, Ser. No. 876,394
The portion of the term of this patent subsequent to Nov. 8, 2003, has been disclaimed.
Int. Cl.[4] H04M *3/50*
U.S. Cl. 379—67 23 Claims



1. For use with an operator-assisted telephone service facility in which on-line participation by an on-line operator is required for effectively enabling an incoming caller to reach a called destination, an arrangement for providing a response message to said incoming caller accessing said facility comprising:

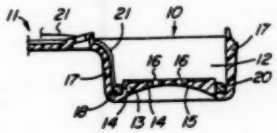
first operational means for storing at least one prescribed response message, which, when played back, effectively corresponds to the voice of the operator who is on-line with and services incoming calls; and

second operational means, coupled to said first operational means and operable in conjunction with the on-line operator's servicing of an incoming call, for accessing a response message from said first operational means in dependence upon information contained within said incoming call being serviced by said on-line operator and which is representative of the type of call to which said incoming call corresponds, and causing said accessed response message to be played back to said incoming caller.

4,697,283
TELEPHONE HANDSET WITH INTEGRATED FLUX COIL

Conrad D. Lafrance, Aylmer, and Peter Fatovic, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 8, 1985, Ser. No. 785,374
Int. Cl.[4] H04M *11/00, 1/03*
U.S. Cl. 379—443 4 Claims

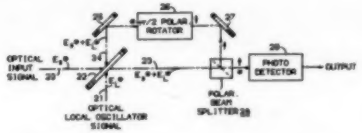


1. A telephone handset having a tubular housing extending forward at one end for reception of a receiver therein; said tubular housing having a peripheral wall and a front wall closing a front end of the tubular housing; a seating formed on an inner surface of said front wall and an annular recess extending around said seating between said seating and said peripheral wall; a receiver positioned in said tubular housing and having a front surface positioned on said seating; and a flux coil positioned in said recess, said flux coil being positioned adjacent said peripheral wall and forward of said front surface of said receiver, and connected electrically to said receiver.

4,697,284
SINGLE-PHOTODIODE OPTICAL HETERODYNE MIXERS

Bernard, Glance, Colts Neck, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 8, 1986, Ser. No. 860,822
Int. Cl.[4] H04B *9/00*
U.S. Cl. 455—619 8 Claims



1. An optical heterodyne mixer comprising:

a first and a second input terminal for receiving an optical signal and an optical local oscillator signal, respectively, each optical signal comprising a same direction of polarization;

means for both (a) combining the signals received at the first

and second input terminals and (b) directing first and second substantially equal portions of the combined signals along first and second output paths, respectively;

means disposed in one of the output paths from the combining and directing means for rotating the direction of polarization of the portion of the combined signals propagating in the one output path by $\pi/2$ radians;

a polarizing beam-splitter disposed to receive the combined signals propagating in the first and second output paths from the combining and directing means for coaxially aligning both (a) the first combined signal portion with a first polarization direction propagating in the first output path and (b) the second combined signal portion with a second polarization direction propagating in the second output path into an output beam directed along a predetermined path; and

a photo detector disposed to receive the coaxially aligned signals in tbe output beam from the polarizing beam-splitter for independently detecting each of the first and second combined signal portions and generating an output current which is the sum of the two combined signal portions at an output of the mixer.

292,040

SHOE UPPER

James K. Tong, and Brenda C. Kelley, both of Beaverton, Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.

Filed Jan. 29, 1987, Ser. No. 8,419

Term of patent 14 years

U.S. Cl. D2—314

292,041

SHOE SOLE

James K. Tong, Beaverton, Oreg., assignor to Pensa, Inc., Portland, Oreg.

Filed Aug. 22, 1986, Ser. No. 899,125

Term of patent 14 years

U.S. Cl. D2—320

292,042

UMBRELLA HANDLE

Julie A. Selig, New York, N.Y., assignor to 'totes' incorporated, Loveland, Ohio

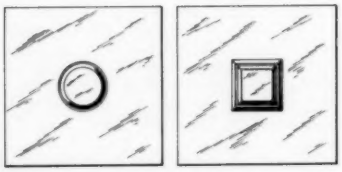
Filed Jun. 6, 1985, Ser. No. 742,025

Term of patent 14 years

U.S. Cl. D3—10

292,043
WALL MIRROR
Frank Billiet, Kortrijk, Belgium, assignor to Mirodan, Etn. L. D'Haene & Zonen, Kortrijk-Heule, Belgium
Division of Ser. No. 484,211, Apr. 12, 1983, Pat. No. Des. 285,505. This application Mar. 3, 1986, Ser. No. 840,729
Term of patent 14 years
U.S. Cl. D6—300

292,044
WALL MIRROR
Frank Billiet, Kortrijk, Belgium, assignor to Mirodan, Etn. L. D'Haene & Zonen, Kortrijk-Heule, Belgium
Division of Ser. No. 484,211, Apr. 12, 1983, Pat. No. Des. 285,505. This application Mar. 3, 1986, Ser. No. 840,730
Term of patent 14 years
U.S. Cl. D6—300



292,045
EASEL DESIGN
Gordon E. McDowell, 16 N. Garfield, Lombard, Ill.
Filed Jan. 23, 1985, Ser. No. 694,288
Term of patent 14 years
U.S. Cl. D6—311

292,046
CHAIR
Kenneth H. Walker, New York, N.Y., assignor to The Gunlocke Company, Wayland, N.Y.
Filed Mar. 7, 1985, Ser. No. 708,973
The portion of the term of this patent subsequent to Jul. 30, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—370

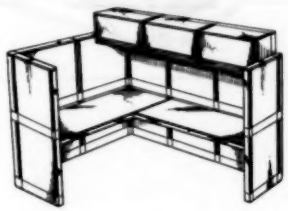
292,047
OFFICE CHAIR
Ullrich H. Bitsch, Dusseldorf, Fed. Rep. of Germany, assignor to Drabert Sohne GmbH & Co., Minden, Fed. Rep. of Germany
Filed Feb. 25, 1985, Ser. No. 704,845
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 6A AR 333/84
Term of patent 14 years
U.S. Cl. D6—365

292,048
CHAIR
Kathryn M. Shaffer, 1735 General Pershing Apt. B., New Orleans, La. 70115
Filed Nov. 16, 1984, Ser. No. 671,971
Term of patent 14 years
U.S. Cl. D6—363

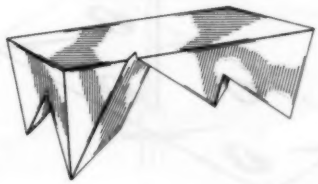
292,049
CHAIR
Paul R. Goldman, Andover, Mass., assignor to Plycraft Inc., Lawrence, Mass.
Filed Apr. 19, 1985, Ser. No. 724,975
Term of patent 14 years
U.S. Cl. D6—379

292,050
CHAIR
John M. Giordano, 200 Pine Hollow Rd., Norfolk, Va. 23502
Filed Dec. 31, 1984, Ser. No. 688,171
Term of patent 14 years
U.S. Cl. D6—380

292,051
MODULAR OFFICE WORK STATION
Thomas J. Martin, Arnprior, Canada, assignor to Tetrad Marketing/Sales Ltd., Canada
Filed Jun. 27, 1985, Ser. No. 749,284
Term of patent 14 years
U.S. Cl. D6—421



292,052
TABLE
Edward F. Lorio, 1207 Nathan Hunt Rd., Greensboro, N.C. 27410
Filed May 6, 1985, Ser. No. 730,496
Term of patent 14 years
U.S. Cl. D6—482



292,053

PLANT HOLDER

Cathy L. Spurling, and Kerry L. Spurling, both of R.F.D. 2, Box 391, Gardner, Me. 04345

Filed Mar. 4, 1985, Ser. No. 707,734

Term of patent 14 years

U.S. Cl. D6—514

292,054

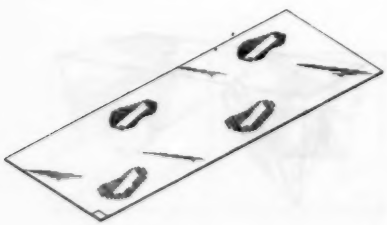
TACKY FLOOR MAT

Marcel Lussier, Enfield, Conn., assignor to Markel Industries, Inc., Somersville, Conn.

Filed Mar. 13, 1985, Ser. No. 711,389

Term of patent 14 years

U.S. Cl. D6—588



292,055

DESIGN FOR A COVERED DISH

Johan van Loon, Haagweg, Fed. Rep. of Germany, assignor to Rosenthal Aktiengesellschaft Rechtsabteilung, Fed. Rep. of Germany

Filed Aug. 23, 1984, Ser. No. 643,660

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1984, 7368

Term of patent 14 years

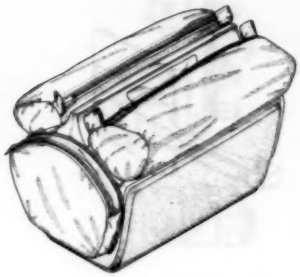
U.S. Cl. D7—16

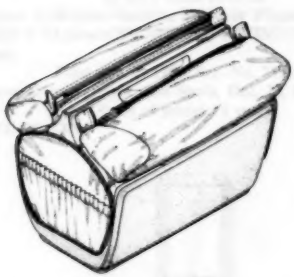
292,056

CONTAINER HAVING AN ACCESSORY BAG THEREON

Joseph A. Decker, Jr., Katy; Joseph F. Fiore, Jr., and Stanley A. Katz, both of Houston, all of Tex., assignors to Igloo Corporation, Houston, Tex.

Filed May 8, 1985, Ser. No. 732,347
Term of patent 14 years
U.S. Cl. D7—77



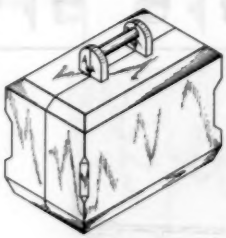


292,057

SIX PACK BEVERAGE COOLER

John R. Beal, R.R. #3, Box 314, Cannon Falls, Minn. 55009

Filed Sep. 26, 1984, Ser. No. 654,553
Term of patent 14 years
U.S. Cl. D7—77

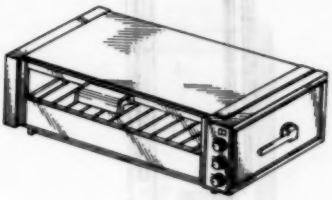


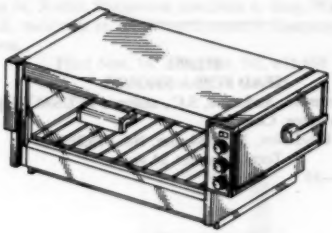
292,058

TOASTER OVEN

William C. Cesaroni, Glenview, Ill., assignor to Dart Industries Inc., Deerfield, Ill.

Filed Sep. 25, 1985, Ser. No. 781,851
Term of patent 14 years
U.S. Cl. D7—350





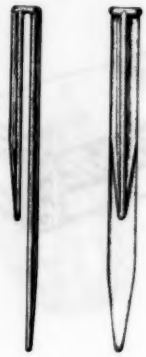
292,059

TURF LIFTING TOOL OR THE LIKE

John E. Heitfield, 4521 Howards Creek Rd., Harrison, Ohio 45030

Filed Jan. 2, 1985, Ser. No. 688,240
Term of patent 14 years
U.S. Cl. D8—1

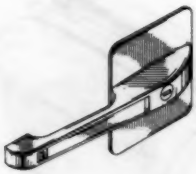
292,060
GROUND STAKE
Stanley M. Kerber, 745 Bolsana Dr., Laguna Beach, Calif. 92651
Filed Jan. 2, 1987, Ser. No. 934
Term of patent 14 years
U.S. Cl. D8—1



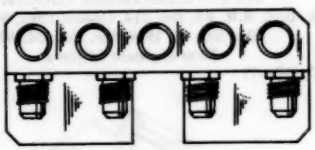
292,061
HEAD FOR A SHOVEL
Robert A. Germain, Anderson, S.C., assignor to USM Corporation, Farmington, Conn.
Filed Nov. 29, 1984, Ser. No. 676,369
Term of patent 14 years
U.S. Cl. D8—10

292,062
ADJUSTABLE WRENCH
Donald W. Doman, Janesville, and Frank Mikic, Kenosha, both of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.
Filed Mar. 5, 1984, Ser. No. 586,037
Term of patent 14 years
U.S. Cl. D8—22

292,063
COMBINED AUTOMOBILE DOOR HANDLE AND COVER PLATE
Mark L. Hill, 3920 E. River Rd., Tucson, Ariz. 85718
Filed Aug. 23, 1984, Ser. No. 643,846
Term of patent 14 years
U.S. Cl. D8—302



292,064
REFRIGERATION GAUGE MANIFOLD BRACKET
John A. Kotz, Box 310, Lions Bay, British Columbia, Canada (V0N 2E0), and Rodney W. Mitchell, 14376 66th A Avenue, Surrey, British Columbia, Canada (V3W 7K3)
Filed Feb. 22, 1985, Ser. No. 704,551
Term of patent 14 years
U.S. Cl. D8—373

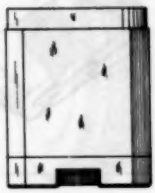


292,065
CHAIN LINK
Goran Abbestam, Goteborg, and Leif Lachonius, Surte, both of Sweden, assignors to Aktiebolaget SKF, Goteborg, Sweden
Filed Mar. 15, 1985, Ser. No. 712,347
Term of patent 14 years
U.S. Cl. D8—499

292,066
SPRAY DISPENSER
Francisco Rodríguez Gazulla, Palau de Plegamans, Spain, assignor to Monturas y Forniturus, S.A. (MYFSA), Barcelona, Spain
Filed Apr. 2, 1985, Ser. No. 719,155
Claims priority, application Spain, Dec. 22, 1984, 107,386
Term of patent 14 years
U.S. Cl. D9—300

292,067
CARTON
Chogoroh Ohotani, Kobe, Japan, assignor to Kabushiki Kaisha Shinwa, Kobe, Japan
Continuation-in-part of Ser. No. 610,813, May 14, 1984. This application Jun. 14, 1984, Ser. No. 620,796
Term of patent 14 years
U.S. Cl. D9—332

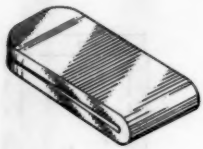
292,068
DISPENSING CONTAINER FOR A SOLID STICK PRODUCT
James M. Keeler, Ridgewood, and John A. Grip, Wayne, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Nov. 14, 1984, Ser. No. 671,650
Term of patent 14 years
U.S. Cl. D9—370



292,069
COMBINED DISPENSING CONTAINER AND CAP
James M. Keeler, Ridgewood, and John A. Grip, Wayne, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Nov. 14, 1984, Ser. No. 671,655
Term of patent 14 years
U.S. Cl. D9—370

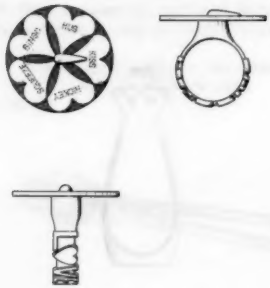
292,070
BOTTLE
Ali Kassamali, Cincinnati, Ohio, and Robert H. Kordenbrock, Verona, Ky., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed May 8, 1985, Ser. No. 731,820
Term of patent 14 years
U.S. Cl. D9—404

292,071
TUBE SQUEEZER
William J. M. Weir, 407 Lanipuao St., Honolulu, Hi. 96825
Filed Dec. 14, 1984, Ser. No. 682,058
Term of patent 14 years
U.S. Cl. D9—442

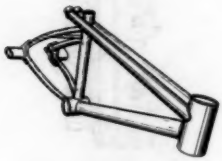


292,072
COMBINED LIQUID LEVEL GUAGE AND THERMOMETER
Alberto Bertani, Milan, Italy, assignor to Elesa S.p.A., Milan, Italy
Filed Sep. 10, 1984, Ser. No. 649,126
Claims priority, application Italy, Mar. 26, 1984, 2135B/84
Term of patent 14 years
U.S. Cl. D10—53

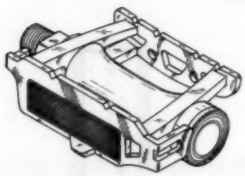
292,073
FINGER RING
Dominic T. DiPasquale, 24 W. 5th St., Oswego, N.Y. 13126
Filed Feb. 15, 1985, Ser. No. 702,249
Term of patent 14 years
U.S. Cl. D11—30



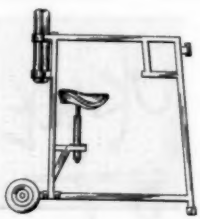
292,074
BICYCLE FRAME
Frederick C. Schilplin, Annandale, Minn., assignor to American Bicycle Manufacturing Company, St. Cloud, Minn.
Filed Mar. 4, 1985, Ser. No. 708,021
Term of patent 14 years
U.S. Cl. D12—111



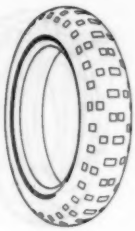
292,075
BICYCLE PEDAL
Hiroyuki Kiyota, 3-11, Rokucho 2-Chome, Adachi-Ku, Tokyo, Japan
Filed May 1, 1985, Ser. No. 729,550
Term of patent 14 years
U.S. Cl. D12—125



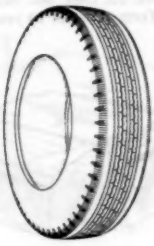
292,076
WALKER
Gilbert E. Peters, Ladysmith, Wis., assignor to Theraped, Inc., Ladysmith, Wis.
Filed Mar. 6, 1985, Ser. No. 707,891
Term of patent 14 years
U.S. Cl. D12—130



292,077
MOTORCYCLE TIRE
Kiyoshi Funahara, Hyogo, Japan, assignor to Sumimoto Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 22, 1985, Ser. No. 714,944
Claims priority, application Japan, Jan. 16, 1985, 60-1028
Term of patent 14 years
U.S. Cl. D12—140



292,078
AUTOMOBILE TIRE
Akihiro Takeuchi, Hyogo, Japan, assignor to Sumimoto Rubber Industries, Ltd., Hyogo, Japan
Filed Apr. 19, 1985, Ser. No. 725,329
Claims priority, application Japan, Feb. 4, 1985, 60-4125
Term of patent 14 years
U.S. Cl. D12—141

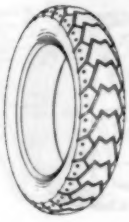


292,079
MOTORCYCLE TIRE
Kazushige Ikeda, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed Aug. 13, 1985, Ser. No. 765,108
Claims priority, application Japan, Jun. 21, 1985, 60-26553
Term of patent 14 years
U.S. Cl. D12—145

292,080
AUTOMOBILE TIRE
Toshio Hayakawa, and Tetsuro Kobayashi, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Jun. 6, 1985, Ser. No. 741,994
Claims priority, application Japan, Dec. 11, 1984, 59-50575
Term of patent 14 years
U.S. Cl. D12—146

292,081
AUTOMOBILE TIRE
Yutaka Kuroda, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed Jul. 26, 1985, Ser. No. 759,362
Claims priority, application Japan, Apr. 27, 1985, 60-17564
Term of patent 14 years
U.S. Cl. D12—146

292,082
MOTORCYCLE TIRE
Toshio Hayakawa, and Shinichiro Ohkuni, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Dec. 3, 1984, Ser. No. 677,440
Claims priority, application Japan, Jun. 1, 1984, 59-22296
Term of patent 14 years
U.S. Cl. D12—147



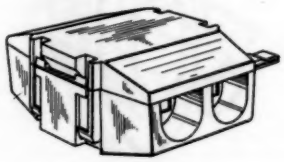
292,083
AUTOMOBILE TIRE
Mitsuo Ozawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed Apr. 5, 1985, Ser. No. 720,404
Claims priority, application Japan, Jan. 30, 1985, 60-3343
Term of patent 14 years
U.S. Cl. D12—147

292,084
AUTOMOBILE TIRE
Toshiaki Suzuki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed Apr. 5, 1985, Ser. No. 720,366
Claims priority, application Japan, Jan. 30, 1985, 60-3345
Term of patent 14 years
U.S. Cl. D12—147

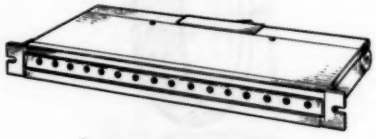
292,085
AUTOMOBILE TIRE
Kenji Hatakenaka, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed May 2, 1985, Ser. No. 729,664
Claims priority, application Japan, Feb. 20, 1985, 60-5413
Term of patent 14 years
U.S. Cl. D12—147

292,086
MOTORCYCLE TIRE
Shigehiko Suzuki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan
Filed May 2, 1985, Ser. No. 729,870
Claims priority, application Japan, Feb. 14, 1985, 60-5493
Term of patent 14 years
U.S. Cl. D12—147

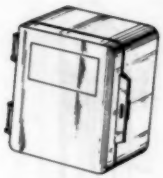
292,087
WIRE TAP CONNECTOR
Sydney Bryant, Taree, Australia, assignor to Sydney, Bryant Manufacturing Pty. Ltd., New South Wales, Australia
Filed Dec. 20, 1984, Ser. No. 684,142
Term of patent 14 years
U.S. Cl. D13—24



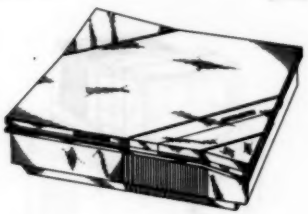
292,088
FIBER OPTICAL DISTRIBUTION BOX
Nere Eriksson, Rönninge, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden
Filed Aug. 6, 1984, Ser. No. 638,360
Claims priority, application Sweden, Feb. 9, 1984, 840415
Term of patent 14 years
U.S. Cl. D13—40



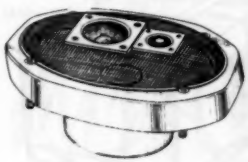
292,089
PROTECTION HOUSING FOR TELECOMMUNICATION EQUIPMENT OR THE LIKE
Thomas J. Smith, Bay Shore, and Ronald C. Urban, Bellerose, both of N.Y., assignors to TII Industries, Inc., Copiague, N.Y.
Filed Jan. 28, 1985, Ser. No. 695,612
Term of patent 14 years
U.S. Cl. D13—41



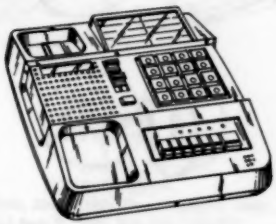
292,090
TELEPHONE ANSWERING MACHINE
Masahiro Shintomi, Gunma, Japan, assignor to Sanyo Electric Co., Ltd. and Tokyo Sanyo Electric Co., Ltd., both of, Japan
Filed Oct. 23, 1984, Ser. No. 663,874
Claims priority, application Japan, Apr. 27, 1984, 59-17702
Term of patent 14 years
U.S. Cl. D14—4



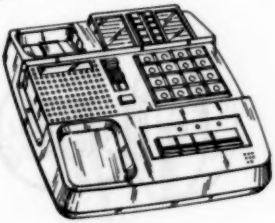
292,091
SPEAKER
Noboru Keitoku, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed May 15, 1985, Ser. No. 734,229
Claims priority, application Japan, Dec. 28, 1984, 59-53745
Term of patent 14 years
U.S. Cl. D14—30



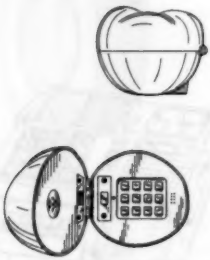
292,092
TELEPHONE BASE
James M. Rittenhouse, Watchung; Barry M. Haber, Manalapan, and Ting W. Wong, Oceanport, all of N.J., assignors to Conair Corporation, Edison, N.J.
Filed Aug. 23, 1985, Ser. No. 768,800
The portion of the term of this patent subsequent to Sep. 29, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—62



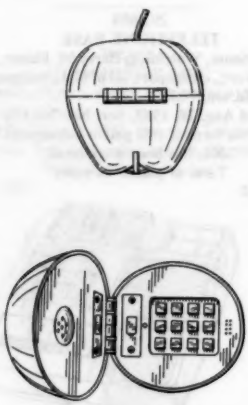
292,093
TELEPHONE BASE
James M. Rittenhouse, Watchung; Barry M. Haber, Manalapan, and Ting W. Wong, Oceanport, all of N.J., assignors to Conair Corporation, Edison, N.J.
Filed Aug. 28, 1985, Ser. No. 768,801
The portion of the term of this patent subsequent to Sep. 29, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—62



292,094
HANDSET TELEPHONE
Takei Yoshiharu, New Territories, Hong Kong, assignor to Tasca International Ltd., Kowloon, Hong Kong
Filed Mar. 5, 1986, Ser. No. 841,732
Claims priority, application United Kingdom, Oct. 15, 1985, 1029858
Term of patent 14 years
U.S. Cl. D14—64

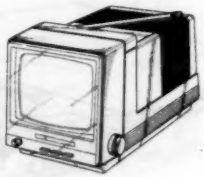


292,095
HANDSET TELEPHONE
Takei Yoshiharu, New Territories, Hong Kong, assignor to Tasca International Ltd, Kowloon, Hong Kong
Filed Mar. 5, 1986, Ser. No. 841,733
Claims priority, application United Kingdom, Oct. 14, 1985, 1029834
Term of patent 14 years
U.S. Cl. D14—64

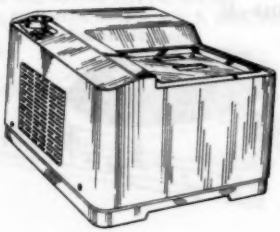


292,096
PORTABLE RADIO PAGER
Peter E. Carr, Hertfordshire, England, assignor to Standard Telephones and Cables, Plc, London, England
Filed Feb. 28, 1985, Ser. No. 706,671
Claims priority, application United Kingdom, Aug. 29, 1984, 1021772
Term of patent 14 years
U.S. Cl. D14—68

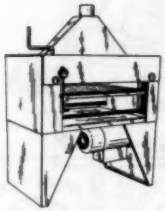
292,097
COMBINED RADIO AND TELEVISION RECEIVER
Tsugio Akita; Toyoyuki Uematsu, both of Osaka; Masaki Yamamoto, Nara; Hiroyuki Tsubaki, Osaka, and Yoshiaki Kawata, Hyogo, all of Japan, assignors to Matsushita Electric Industrial Co, Osaka, Japan
Filed Nov. 13, 1984, Ser. No. 670,191
Claims priority, application Japan, May 15, 1984, 59-19597
Term of patent 14 years
U.S. Cl. D14—72



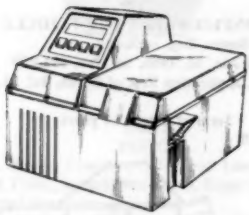
292,098
ICE CREAM MAKER
Alberto Pandolfi, Milan, Italy, assignor to Brevetti Gaggia S.p.A., Milan, Italy
Filed Aug. 7, 1985, Ser. No. 763,404
Claims priority, application Italy, Mar. 18, 1985, 53140/85[U]
Term of patent 14 years
U.S. Cl. D15—82



292,099
SANDING MACHINE
John E. Miller, Jr., Kansas City, Mo., assignor to Woodmaster Tools, Inc., Kansas City, Mo.
Filed Jul. 8, 1985, Ser. No. 752,665
Term of patent 14 years
U.S. Cl. D15—124

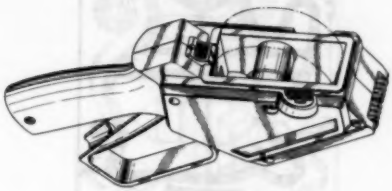


292,100
AUTOMATIC WIRE CUTTING MACHINE
Arthur Goldsmith, Lafayette, and Thomas Carpenter, Manlius, both of N.Y., assignors to Carpenter Manufacturing Co., Manlius, N.Y.
Filed Sep. 12, 1983, Ser. No. 531,136
Term of patent 14 years
U.S. Cl. D15—127



292,101
PAIR OF EYE GLASSES
Trevor I. Baptiste, 383 Grand Ave., Brooklyn, N.Y. 11238
Filed Nov. 5, 1984, Ser. No. 668,472
Term of patent 14 years
U.S. Cl. D16—104

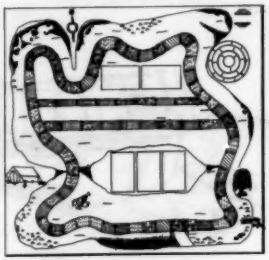
292,102
COMBINED LABELER AND REPLACEABLE TAPE CARTRIDGE THEREFOR
Shoji Takahashi, Kawaguchishi, Japan, assignor to Kabushiki Kaisha Shinsei Industries, Tokyo, Japan
Filed Feb. 19, 1985, Ser. No. 702,903
Claims priority, application Japan, Aug. 21, 1984, 59-34705
Term of patent 14 years
U.S. Cl. D18—19



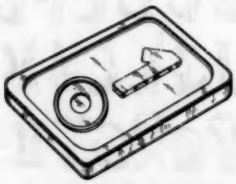
292,103
FONT OF TYPE
Lawrence E. Boliek, 3342 Kristy Dr., Memphis, Tenn. 38118
Filed Sep. 9, 1985, Ser. No. 774,009
Term of patent 14 years
U.S. Cl. D18—27

292,104
HANDLE FOR A WRITING INSTRUMENT OR THE LIKE
Fred Keller, Jr., 1410 Winston Cir., Bethelem, Pa. 18017
Filed Jul. 14, 1983, Ser. No. 513,638
Term of patent 14 years
U.S. Cl. D19—55

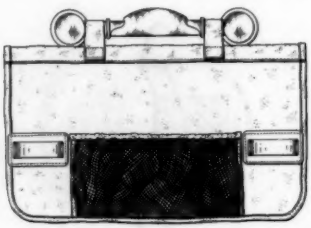
292,105
FISHING GAME BOARD
Joseph C. Aguirre, 2220 Conway St., St. Paul, Minn. 55119
Filed Apr. 24, 1985, Ser. No. 726,513
Term of patent 14 years
U.S. Cl. D21—25



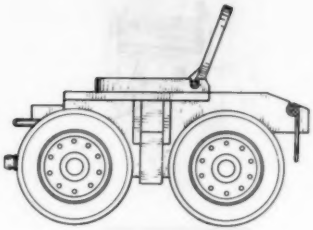
292,106
PLAYING PIECE
Micha Hertzano, 53 Drezner Street, Tel-Aviv, Israel
Filed Jan. 2, 1985, Ser. No. 688,350
Claims priority, application Israel, Jul. 6, 1984, 9963
Term of patent 14 years
U.S. Cl. D21—51



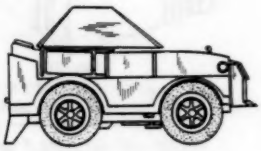
292,107
BATH TOY
Christine M. Zinter-Chahin, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 10, 1985, Ser. No. 786,295
Term of patent 14 years
U.S. Cl. D21—59



292,108
TOY VEHICLE
Howard N. Bollinger; Robert E. Cordrey; Charles E. Ligon, and David A. Myers, all of Cincinnati, Ohio, assignors to Kenner Parker Toys Inc., Beverly, Mass.
Filed Feb. 14, 1985, Ser. No. 701,582
Term of patent 14 years
U.S. Cl. D21—137



292,109
RECONFIGURABLE TOY VEHICLE
Sang-Kwon Lim, Busan, Rep. of Korea
Filed Jan. 16, 1985, Ser. No. 691,920
Claims priority, application Rep. of Korea, Jul. 21, 1984, Des. 8730
Term of patent 14 years
U.S. Cl. D21—150



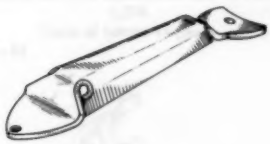
292,110
WALKING ROBOT
Shin Tamakoshi, Tokyo, Japan, assignor to Kabushiki Kaisha Taito, Tokyo, Japan
Filed Apr. 30, 1985, Ser. No. 729,108
Claims priority, application Japan, Oct. 31, 1984, 59-45034
Term of patent 14 years
U.S. Cl. D21—150

292,111
BATTERY OPERATED BIRD FIGURES TOY
Seiichi Kijima, and Yoshihiro Miura, both of Tokyo, Japan, assignors to Masudaya Corporation, Tokyo, Japan
Filed Feb. 6, 1985, Ser. No. 698,247
Term of patent 14 years
U.S. Cl. D21—160

292,112
PISTOL
William B. Ruger, Croydon, N.H., and Lawrence L. Larson, Branford, Conn., assignors to Sturm, Ruger & Company, Inc., Southport, Conn.
Filed Jun. 25, 1984, Ser. No. 624,186
Term of patent 14 years
U.S. Cl. D22—104

292,113
DEFENSIVE ELECTRIC PROD WEAPON OR SIMILAR ARTICLE
Shin L. Hsu, No. 25, Lane 152, Kun Yang St., Nan Kand, Taipei, Taiwan
Filed Jun. 27, 1985, Ser. No. 750,430
Term of patent 14 years
U.S. Cl. D22—117

292,114
FISHING LURE
John A. Varaney, 23 Overton Ave., Milford, Conn. 06460
Filed May 15, 1985, Ser. No. 734,073
Term of patent 14 years
U.S. Cl. D22—129



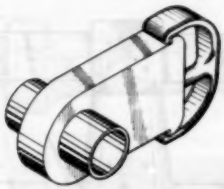
292,115
ROLLER GUIDE FOR A FISHING ROD
Herbert Ziemelis, Wallingford, Conn., assignor to Mildrum Manufacturing Co., East Berlin, Conn.
Filed Jul. 25, 1984, Ser. No. 634,305
Term of patent 14 years
U.S. Cl. D22—143

292,116
ROLLER GUIDE FOR A FISHING ROD
Herbert Ziemelis, Wallingford, Conn., assignor to Mildrum Manufacturing Co., East Berlin, Conn.
Filed Jul. 25, 1984, Ser. No. 634,306
Term of patent 14 years
U.S. Cl. D22—143

292,117
SUPPORT STAND FOR SWIMMING POOL FILTRATION UNITS
George F. Arp, Fairport, N.Y., assignor to Ampro-Diaclear, Inc., Bronx, N.Y.
Filed Oct. 15, 1985, Ser. No. 787,314
Term of patent 14 years
U.S. Cl. D23—1

292,118
COMBINED IRRIGATING AND DIGGING TOOL
Edward H. Hill, 1825 Kuehler Ave., New Braunfels, Tex. 78130
Filed Aug. 22, 1985, Ser. No. 768,209
Term of patent 14 years
U.S. Cl. D23—17

292,119
GATE VALVE
Eldon Hostetler, Middlebury, Ind., assignor to Ziggity Systems, Inc., Middlebury, Ind.
Filed Jan. 24, 1985, Ser. No. 694,228
Term of patent 14 years
U.S. Cl. D23—19



292,120
COMBINED BALL COCK AND FLOAT
R. Frank Nestich, Glenmont, Ohio, assignor to Clevepak Corporation, Purchase, N.Y.
Filed May 20, 1985, Ser. No. 735,585
Term of patent 14 years
U.S. Cl. D23—19

292,121
SOLID FUEL BURNING STOVE
Gerald W. Lee, Kirkland, Wash., assignor to Woodcutters Manufacturing, Inc., Walla Walla, Wash.
Filed Apr. 30, 1985, Ser. No. 729,131
Term of patent 14 years
U.S. Cl. D23—97

292,122
KEROSENE STOVE
Koichi Sakai, Moriguchi, Japan, assignor to Imanishi Kinzoku Kogyo Kasbushiki Kaisha, Japan
Filed Sep. 4, 1985, Ser. No. 772,349
Term of patent 14 years
U.S. Cl. D23—121

292,123
ORTHODONTIC APPLIANCE ACCESSORY
Maclay M. Armstrong, Seattle; Steven A. Houser, Edmonds, and Jeffrey A. Armstrong, Mercer Island, all of Wash., assignors to Unitek Corporation, Monrovia, Calif.
Division of Ser. No. 859,874, May 2, 1986, Pat. No. Des. 289,328, which is a continuation of Ser. No. 834,288, Feb. 27, 1986, which is a continuation-in-part of Ser. No. 609,409, May 11, 1984, abandoned. This application Jan. 7, 1987, Ser. No. 1,278
Term of patent 14 years
U.S. Cl. D24—10

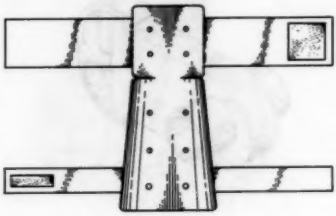
292,124
COMBINED PIN AND GUIDE FOR POSITIONING AN ARTIFICIAL TOOTH
Mack L. Roden, 3705 Midway Dr., and Steven D. Adams, 3980 Midway Dr., both of Baker, Oreg. 97814
Filed Jun. 17, 1985, Ser. No. 745,482
Term of patent 14 years
U.S. Cl. D24—16

292,125
DENTAL POSITIONING PIN
Mack L. Roden, 3705 Midway Dr., and Steven D. Adams, 3980 Midway Dr., both of Baker, Oreg. 97814
Filed Jun. 17, 1985, Ser. No. 745,483
Term of patent 14 years
U.S. Cl. D24—16

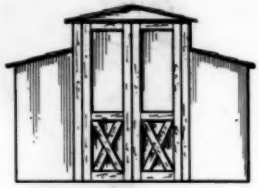
292,126
TONGUE PRESS
Miyako Inoue, Tokyo, Japan, assignor to Inoue Attachment Co., Ltd., Tokyo, Japan
Filed Feb. 7, 1985, Ser. No. 699,340
Claims priority, application Japan, Nov. 1, 1984, 59-044875
Term of patent 14 years
U.S. Cl. D24—19

292,127
COMBINED I.V. CONTAINER HOLDING BAG AND STRAP
Ruby F. Aiello, 5339 Steuben Dr., Memphis, Tenn. 38134
Filed Aug. 16, 1984, Ser. No. 641,297
Term of patent 14 years
U.S. Cl. D24—58

292,128
SPLINT FOR USE ON FINGERS, THUMBS AND WRISTS
Calvin Thibodo, Jr., 301 N. 70th Ter. #421, Kansas City, Kans. 66112
Filed Apr. 1, 1985, Ser. No. 718,442
Term of patent 14 years
U.S. Cl. D24—64

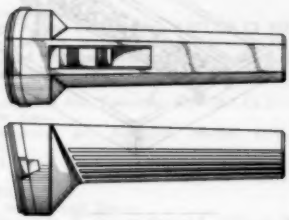


292,129
BUILDING OR SIMILAR ARTICLE
Owen H. Park, Carmel, Ind., assignor to Heartland Industries, Inc., Carmel, Ind.
Filed Jan. 9, 1985, Ser. No. 690,060
Term of patent 14 years
U.S. Cl. D25—22



292,130
FLUORESCENT LAMP
Kazuhiko Kubo, Akishima; Masanori Tsuda, Machida; Taisuke Hirota, Hachiouji; Katsuyuki Hosoya, Oume; Ichirou Torii, Tokyo, and Atsushi Suzuki, Oume, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 1, 1985, Ser. No. 697,467
Term of patent 14 years
U.S. Cl. D26—3

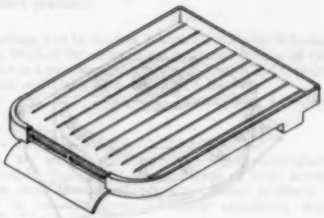
292,131
FLASHLIGHT
Kenneth R. Fenne, Glen Ellyn, Ill., assignor to Pittway Corporation, Aurora, Ill.
Filed Mar. 11, 1985, Ser. No. 710,403
Term of patent 14 years
U.S. Cl. D26—43



292,132
LIGHTER WITH CIGARETTE HOLDER STORING CHAMBER
Masahiro Terasaki, 43 Okimiya-cho, Edogawa-ku, Tokyo, Japan
Filed Oct. 30, 1985, Ser. No. 792,917
Term of patent 14 years
U.S. Cl. D27—42

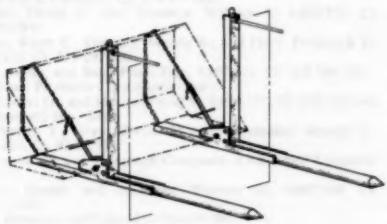
292,133
PRESSURE SPRAY WASHER OR THE LIKE
Rudy R. Proctor, Costa Mesa, and Fred M. Reinstein, Encino, both of Calif., assignors to Turbo Tek Enterprises, Inc., Los Angeles, Calif.
Filed Mar. 21, 1985, Ser. No. 714,159
Term of patent 14 years
U.S. Cl. D32—1

292,134
SINK DRAINBOARD
Walter C. McDaniel, Sr., Rte. 5, Box 92, Eufaula, Ala. 36027
Filed Jan. 23, 1986, Ser. No. 821,770
Term of patent 14 years
U.S. Cl. D32—56

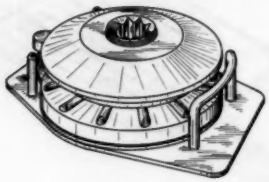


292,135
COLLAPSIBLE CART
John W. Grube, and Robert E. Burridge, both of Santa Barbara, Calif., assignors to Avitare, Santa Barbara, Calif.
Filed Dec. 4, 1984, Ser. No. 678,751
Term of patent 14 years
U.S. Cl. D34—24

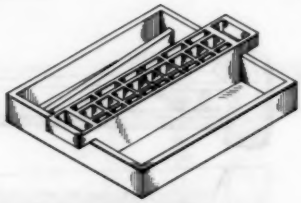
292,136
PAIR OF FRONT LOADER BUCKET TINES
Thomas I. Burenga, Montgomery County, Ill., assignor to Worksaver, Inc., Litchfield, Ill.
Filed Jan. 11, 1984, Ser. No. 570,021
Term of patent 14 years
U.S. Cl. D34—35



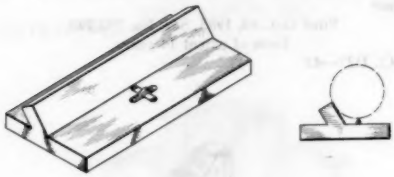
292,137
WINCH
Frode Andersen, Jaegervaenget 36, DK-7100 Vejle, Denmark
Filed Jan. 15, 1985, Ser. No. 691,695
Term of patent 14 years
U.S. Cl. D34—33



292,138
TOOL TRAY
Charles D. Gatlin, Jr., 1168 Sycamore, Collierville, Tenn. 38017
Filed Jun. 4, 1984, Ser. No. 617,257
Term of patent 14 years
U.S. Cl. D34—45



292,139
COIN ROLL OPENER
James A. Beal, 6221 Tishimingo Ct., Citrus Heights, Calif. 95610
Filed Feb. 5, 1985, Ser. No. 698,463
Term of patent 14 years
U.S. Cl. D99—34



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF SEPTEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. C. Nielsen Company: *See*—
Kiewit, David A.; and Lu, Daozheng, 4,697,209, Cl. 358-84.000.

Abe, Michiharu; Umehara, Masaakira; Sato, Tsutomu; Oba, Hideaki; Ueda, Yutaka; and Kunikane, Makoto, to Ricoh Co., Ltd. Optical information recording medium. 4,696,892, Cl. 430-495.000.

Abe, Yoshinobu: *See*—
Ishitsubo, Kenji; and Abe, Yoshinobu, 4,697,065, Cl. 219-219.000.

Abegglen, Martin: *See*—
Renker, Hansjoerg; and Abegglen, Martin, 4,696,839, Cl. 428-15.000.

Abend, Phillip G.: *See*—
Novakovic, Mario; and Abend, Phillip G., 4,696,767, Cl. 252-557.000.

ACF Industries, Incorporated: *See*—
Billingsley, Robert H., Jr.; Jantzen, Steven L.; O'Leary, Walter E.; and Krug, John A., 4,696,238, Cl. 105-248.000.

Acock, George W., Jr.: *See*—
Wren, Michael; Lantz, Paul W.; Acock, George W., Jr.; and Rhodes, James A., 4,696,133, Cl. 52-80.000.

Acqua-Tronics, Inc.: *See*—
Haddon, Merrill; and Moulton, Clifford H., 4,697,137, Cl. 324-512.000.

AcroMed Corporation: *See*—
Steffee, Arthur D., 4,696,290, Cl. 128-69.000.

Adams, Don L.: *See*—
Wright, Stuart C.; Stiles, Lorren, Jr.; and Adams, Don L., 4,696,445, Cl. 244-229.000.

Adams, Graham L.; and Durrant, Richard C. E., to STC, plc. Optical fibre connector having particular utility for underwater use. 4,696,540, Cl. 350-96.210.

Adaniya, George: *See*—
Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, 4,696,671, Cl. 604-67.000.

Adeney, Hilary E.; and Hall, Derrard M., to Dulux Australia Ltd. Multi-component coating compositions. 4,696,957, Cl. 523-406.000.

Adler, Michael S.: *See*—
Harnden, John D., Jr.; Kornrumpf, William P.; Kohl, James E.; and Adler, Michael S., 4,697,118, Cl. 310-331.000.

Advanced Extraction Technologies, Inc.: *See*—
Mehra, Yuv R., 4,696,688, Cl. 62-17.000.

Advanced Micro Devices, Inc.: *See*—
Thomas, Mammen, 4,696,095, Cl. 437-78.000.
Yen, Yung-Chau, 4,696,098, Cl. 437-187.000.

AEG Kabel Aktiengesellschaft: *See*—
Haag, Helmut; and Nothofer, Klaus, 4,696,541, Cl. 350-96.230.

AEPLC: *See*—
Eastwood, Barry J., 4,696,867, Cl. 428-650.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Bost, Michel, 4,696,623, Cl. 416-230.000.

Agency of Industrial Science and Technology: *See*—
Koyama, Shuntaro; Miyadera, Hiroshi; and Miyamoto, Tomohiko, 4,696,678, Cl. 48-201.000.

Agobian, Manuel: *See*—
Farel, Alain; Agobian, Manuel; and Le, Sinh, 4,697,050, Cl. 178-18.000.

Ahiko, Nobuo: *See*—
Okada, Yoshio; Ahiko, Nobuo; and Igarashi, Yuriko, 4,696,856, Cl. 428-321.500.

Ahlf, Heinz-Jurgen; Guhne, Wieland; Simm, Hans-Peter; and Wulf, Peter, to Vorwerk & Co. Interholding GmbH. Vacuum cleaner nozzle. 4,696,076, Cl. 15-415.00R.

Ahmad, Shamoon. Electronic assembly toy. 4,696,647, Cl. 434-224.000.

Aho, Richard. Front wheel hub clutch. 4,696,382, Cl. 192-67.00R.

Ahrens, Kurt H.: *See*—
Kisielowski, Lothar; Grafe, Ingomar; Liebenow, Walter; and Ahrens, Kurt H., 4,697,035, Cl. 558-344.000.

Air Products and Chemicals, Inc.: *See*—
Graf, Hans-Juergen; and Randke, Peter T., 4,696,411, Cl. 220-281.000.
Peterson, Janice C.; and DiMartino, Stephen P., 4,696,806, Cl. 423-248.000.

Airway Industries, Inc.: *See*—
Kim, Hyun S., 4,696,077, Cl. 16-125.000.

Akai Electric Co., Ltd.: *See*—
Shiozaki, Yoshihiko, 4,696,306, Cl. 128-711.000.

Albares, Donald J.; and Reedy, Ronald E., to United States of America, Navy. Integrated optical wavelength demultiplexer. 4,696,536, Cl. 350-96.190.

Albright, James A.; and Wilkinson, Theodore C., to Great Lakes Chemical Corporation. Halogenated alkyl phosphate esters and polymer systems incorporating them. 4,696,963, Cl. 524-144.000.

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Alfa-Laval Food and Dairy Engineering AB: *See*—
Bolmstedt, Ulf; and Johansson, Bjorn-Olow, 4,696,341, Cl. 165-101.000.

Alfatechnic AG: *See*—
Dubach, Werner F., 4,696,408, Cl. 215-237.000.

Ali, Sameh A. H.; and Haag, Juergen, to Kernforschungszentrum Karlsruhe GmbH. Process for the separation of large amounts of uranium from small amounts of radioactive fission products, which are present in basic, aqueous carbonate containing solutions. 4,696,768, Cl. 252-628.000.

Alig, Roger C.; Bloom, Stanley; and Hockings, Eric F., to RCA Corporation. Color display system with electrostatic convergence means. 4,697,120, Cl. 313-412.000.

Alldredge, Mark L. Running board and toolbox. 4,696,507, Cl. 296-37.600.

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Greenwood, Walter L., 4,696,215, Cl. 84-1.030.

Allied Corporation: *See*—
Bauer, Anton E.; Billmann, Gerhard; Rathke, Jorg; Schimanek, Hans-Joachim; Schrott, Georg W.; and Wodok, Hans, 4,696,537, Cl. 350-96.200.
Sibilia, John P.; Kotliar, Abraham M.; Murthy, Narasimhaiah S.; and Sacks, William, 4,696,857, Cl. 428-323.000.
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Alps Electric Co., Ltd.: *See*—
Ishikawa, Keisuke, 4,697,044, Cl. 174-35.00R.
Kano, Mitsuru; and Nakanowatari, Jun, 4,697,015, Cl. 544-335.000.

Alston, David R.: *See*—
Stoddart, James F.; and Alston, David R., 4,696,918, Cl. 514-58.000.

Altmann, Horst-Dieter; and Haupt, Eberhard, to I.G. Bauerhin GmbH Electro-Technische Fabrik. Method and apparatus for heating seats electrically. 4,697,064, Cl. 219-217.000.

Aluminium Pechiney: *See*—
Chaffy, Joseph; and Langon, Bernard, 4,696,730, Cl. 204-243.00M.

Amalric, Jean: *See*—
Walter, Jean-Jacques; Petit, Daniel; Marzocca, Joseph; Amalric, Jean; and Bernard, Georges, 4,697,055, Cl. 200-148.00B.

Amano, Satoru; Horiuchi, Shigenori; and Shinohara, Takeru, to Hoya Corporation. Acoustooptic modulation element and system for acoustooptically carrying out modulation, of a plurality of parallel beams by the use of a single acoustooptic medium. 4,696,551, Cl. 350-358.000.

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Amemiya, Yoichi; Sogabe, Masatoyo; and Tagami, Kiyoshi, to Fanuc Ltd. Permanent-magnet rotor shrink-fit assembly. 4,697,114, Cl. 310-156.000.

Amerace Corporation: *See*—
Smorzaniuk, Adam; and Siebens, Larry N., 4,696,649, Cl. 439-98.000.

American Colloid Company: *See*—
Harriett, Todd D., 4,696,698, Cl. 106-74.000.
Harriett, Todd D., 4,696,699, Cl. 106-74.000.

American Cyanamid Company: *See*—
Chan, Peter S., 4,696,940, Cl. 514-400.000.
Child, Ralph G.; Fields, Thomas L.; Wilkinson, Raymond G.; and Lin, Yang-I, 4,696,936, Cl. 514-297.000.
Dauplaise, David L.; and Trzaskos, William J., 4,696,770, Cl. 252-700.000.
Murdock, Keith C.; Damiani, Martin R.; and Durr, Frederick E., 4,696,935, Cl. 514-297.000.
Wissner, Allan; and Sum, Phaik-Eng, 4,697,031, Cl. 558-169.000.

American Home Products Corporation: *See*—
Blank, Robert G.; and Mody, Dhiraj S., 4,696,757, Cl. 252-186.290.

American Standard Inc.: *See*—
Link, Charles T.; Gray, Bennie M.; and Shumaker, Harold L., 4,696,223, Cl. 92-86.500.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Galensky, Duane; and Hammett, Warren G., 4,697,264, Cl. 370-111.000.
Glance, Bernard, 4,697,284, Cl. 455-619.000.
Lin, Heng-Cheng, 4,697,188, Cl. 342-383.000.
Moy, Thomas H., 4,697,105, Cl. 307-465.000.

American Telephone and Telegraph Company, AT&T Technologies, Inc.: *See—*
Macdonald, John B., 4,697,175, Cl. 340-707.000.
Myers, Daryl L., 4,696,438, Cl. 242-118.410.

AMF Incorporated: *See—*
Esch, Friedrich D.; and Price, John G., 4,696,146, Cl. 53-529.000.

Amoco Corporation: *See—*
McMahon, Patrick E., 4,697,010, Cl. 540-536.000.

Amon, Leopold: *See—*
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.

AMP Incorporated: *See—*
Coller, James R.; and Goodman, Joseph R., 4,696,525, Cl. 439-69.000.
Gutter, David H.; and Shatto, Walter C., Jr., 4,696,908, Cl. 439-98.000.
Keller, Joseph R.; and Longenecker, Bruce C., 4,696,708, Cl. 156-64.000.
Lockard, Joseph L., 4,697,053, Cl. 200-68.200.

Ampex Corporation: *See—*
Liliey, Martin A., 4,697,207, Cl. 358-17.000.

An-Tech International Livestock Products, Inc.: *See—*
Howe, Steven R.; and Howe, Phillip D., 4,696,119, Cl. 40-301.000.

Analog Devices, Inc.: *See—*
Butler, Gregg A., 4,697,151, Cl. 330-2.000.

Ancra Corporation: *See—*
Cole, Stephen C., 4,696,609, Cl. 410-69.000.

Anderson, Gary, to Dennison Manufacturing Company. Fastener for joining materials. 4,696,300, Cl. 128-334.00R.

Anderson, Richard V.; and Carnes, Wendall D., to S.I.E., Inc. Wireline dump bailer. 4,696,343, Cl. 166-164.000.

Anderson, Todd B.: *See—*
Stich, Michael C.; Resman, John B.; Ottesen, Hjalmar H.; and Anderson, Todd B., 4,697,127, Cl. 318-561.000.

Ando Electric Co., Ltd.: *See—*
Morishita, Mitsuhiro; and Sugimori, Masayasu, 4,697,138, Cl. 324-73.00R.

Andoh, Shizuo: *See—*
Shinoda, Tsutae; Miyashita, Yoshinori; Sugimoto, Yoshimi; Sei, Hideo; and Andoh, Shizuo, 4,697,123, Cl. 315-169.400.

Angevine, Philip J.; Chu, Yung F.; Mitchell, Kenneth M.; Oleck, Stephen M.; Shih, Stuart S.; and Wilson, Robert C., Jr., deceased (by Wilson, Lillian S., executrix), to Mobil Oil Corporation. Simultaneous hydrotreating and dewaxing of petroleum feedstocks. 4,696,732, Cl. 208-111.000.

Angewandte Digital Elektronik: *See—*
Jenning, Michael; and Mackenthun, Holger, 4,697,183, Cl. 340-870.250.

Anthony's Manufacturing Company, Inc.: *See—*
Stromquist, Michael E., 4,696,078, Cl. 16-301.000.

Antonides, John E. Portable boat ramp for small watercraft. 4,696,250, Cl. 114-343.000.

Anzini, David J.: *See—*
Shedd, Charles D.; and Anzini, David J., 4,696,967, Cl. 524-437.000.

Aoki, Nobuo: *See—*
Miyoshi, Takahito; Aoki, Nobuo; Yoneyama, Takashi; Kasuga, Akira; Okutu, Toshimitu; Fujiyama, Masaaki; and Okuzawa, Yasutoshi, 4,696,859, Cl. 428-323.000.

Aoki, Takashi; Fukuda, Yukihiro; and Nishikawa, Masao, to Honda Giken Kogyo K.K. Hydraulic clutch for motor vehicles, having creep-inhibiting feature. 4,696,383, Cl. 192-70.120.

Aoki, Yuji; Horiuchi, Hidenaga; Umemoto, Akio; and Miura, Norio, to Kasei Optonix, Ltd. Intensifying screens. 4,696,868, Cl. 428-690.000.

Aono, Akira: *See—*
Ohtani, Takayuki; Isobe, Mitsuo; Aono, Akira; and Urakawa, Nobuaki, 4,697,112, Cl. 307-530.000.

Aoyama, Masaaki; Itabashi, Mitsuharu; Miura, Mariko; and Kohno, Masahiro, to Special Reference Laboratories, Inc.; and JEOL Ltd. Method for diagnosing cancer using ESR. 4,696,905, Cl. 436-64.000.

Aqua Strip Corporation: *See—*
Pedneault, John A., 4,696,739, Cl. 210-121.000.

Araikawa, Mutsuya: *See—*
Ohtani, Teruo; Tamura, Toshihisa; Ikeda, Yuji; Araikawa, Mutsuya; and Kywata, Kazuyoshi, 4,696,635, Cl. 425-330.000.

Arakawa, Satoshi: *See—*
Toyota, Makoto; Takeshita, Fumitaka; and Arakawa, Satoshi, 4,697,210, Cl. 358-98.000.

Arbed S/A: *See—*
Denier, Guy; and Henrion, Romain, 4,696,456, Cl. 266-44.000.

Arbed S.A.: *See—*
Schleich, Jean-Baptiste, 4,696,137, Cl. 52-251.000.

ARBO Medizin-Technologie GmbH.: *See—*
Ding, Wolfgang; and Arnold, Werner, 4,696,527, Cl. 439-53.000.

Arens Controls, Inc.: *See—*
Gregory, Ted W., 4,696,203, Cl. 74-501.00R.

Arima, Itsuo: *See—*
Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; Morita, Mikio; and Kamohara, Hisato, 4,696,725, Cl. 252-62.540.

Arimitsu, Hiroshi; Hatano, Kiyoshi; Nakanishi, Teruyuki; Yoshimura, Yoshio; Urabe, Masaki; and Honda, Tsurakazu, to Kawasaki Steel Corporation; and Kabushiki Kaisha Toshiba. Inductive radio control system for vehicles. 4,697,179, Cl. 340-825.720.

Arisawa, Hiroshi: *See—*
Mita, Tsunemasa; Katoh, Ryoki; Sekimoto, Soichi; Shiratsuki, Yoshiyuki; and Arisawa, Hiroshi, 4,697,204, Cl. 357-74.000.

Armstrong, Gregory J.: *See—*
Doering, Robert R.; and Armstrong, Gregory J., 4,696,092, Cl. 437-5.000.

Armstrong World Industries, Inc.: *See—*
Hoffer, Roy D., 4,697,122, Cl. 315-158.000.

Arnold, Werner: *See—*
Ding, Wolfgang; and Arnold, Werner, 4,696,527, Cl. 439-53.000.

Arrhenius, Gustaf O.: *See—*
Jensen, Eric A.; Hitchin, James; Tsai, Albert G.; and Arrhenius, Gustaf O., 4,696,338, Cl. 165-1.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Kondo, Shigeru, 4,696,559, Cl. 354-403.000.

Asahi Medical Co., Ltd.: *See—*
Nitadori, Yoshiaki; and Nakano, Toru, 4,696,748, Cl. 210-636.000.

Asahi, Takeoki; and Yoshida, Toshihiko, to Sharp Kabushiki Kaisha. Acoustic output device for personal computer. 4,696,216, Cl. 84-1.130.

Asano, Hideharu; and Senda, Hisakazu, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Production of water-insoluble alkali metal salts of carboxyalkyl cellulose. 4,697,008, Cl. 536-89.000.

Asano, Hideo; Makida, Kazuhisa; and Fujiwara, Kenichi, to Nippondenso Co., Ltd. Scroll compressor. 4,696,627, Cl. 418-15.000.

Asano, Masamichi: *See—*
Iwahashi, Hiroshi; Asano, Masamichi; Momodomi, Masaki; Minagawa, Hidenobu; Suzuki, Kazuto; and Narita, Akira, 4,697,101, Cl. 307-452.000.

Asano, Michio: *See—*
Masuda, Noboru; Asano, Michio; Hayashi, Takehisa; Tanaka, Hirotoshi; and Masaki, Akira, 4,697,110, Cl. 307-475.000.

Asari, Akira; and Tabuchi, Takahisa, to Kabushiki Kaisha Kobe Seiko Sho. Pullback type double-acting indirect extrusion press. 4,696,176, Cl. 72-273.500.

Ashland Oil, Inc.: *See—*
Goel, Anil B., 4,696,992, Cl. 528-90.000.

AT&T Technologies Inc., AT&T Bell Laboratories: *See—*
Beggs, Richard D.; Friesen, Harold W.; and Nutt, Wendell G., 4,697,051, Cl. 178-63.00D.

Ateliers de Constructions Electriques de Charleroi (ACEC) Societe Anonyme: *See—*
Verstraete, Willy; and De Ley, Jozef, 4,696,747, Cl. 210-605.000.

Atlantic Richfield Company: *See—*
Bourland, Larry G., 4,696,972, Cl. 525-67.000.
Dean, Barry D., 4,696,978, Cl. 525-205.000.

Atlas Copco Aktiebolag: *See—*
Herron, Lorne R., 4,696,606, Cl. 405-259.000.

Atsugi Motor Parts Company, Limited: *See—*
Komatsu, Shinichi, 4,696,198, Cl. 74-388.0PS.

Aune, Jan A. J.; and Evensen, Knut K., to Elkem a/s. Means for charging liquid slag to a closed smelting furnace. 4,696,457, Cl. 266-207.000.

Austel, Volkhard: *See—*
Hauel, Norbert; Austel, Volkhard; Heider, Joachim; Reiffen, Manfred; and Diederen, Willi, 4,696,931, Cl. 514-261.000.

Automated Semiconductor, Inc.: *See—*
Mukhtar, Saad; and Husain, Syed A., 4,696,727, Cl. 204-206.000.

Automation Development Corporation: *See—*
Cloyd, William C., 4,696,524, Cl. 439-197.000.

Avey, Kenneth F. C., to W & C Pantin Ltd. Apparatus for unloading cylindrical articles from pallets. 4,696,616, Cl. 414-417.000.

Awano, Yoshiro; Suzuki, Hiroshi; Mizuno, Takaji; Ueguri, Shigeo; and Higashida, Kenji, to Mitsubishi Denki K.K.; and Toyota Jidosha K.K. Pulse arc welding machine disabled during short-circuits. 4,697,062, Cl. 219-130.510.

B. F. Goodrich Company, The: *See—*
Cohen, Louis, 4,696,983, Cl. 526-62.000.

Baba, Takashi: *See—*
Kitano, Hirohito; Oowaki, Toshiki; and Baba, Takashi, 4,696,697, Cl. 106-3.000.

Babuin, Piero, to Zanussi Elettrodomestici SPA. Laundry washing machine. 4,696,171, Cl. 68-207.000.

Bactex, Inc.: *See—*
Brinton, Charles C.; and McMichael, John C., 4,696,896, Cl. 435-7.000.

Baggett, David: *See—*
Billiet, Colin T.; Baggett, David; and Fielding, Robert M., 4,696,687, Cl. 55-316.000.

Bahr, Melford J., to MGS Machine Corporation. Pick-and-place glue applicator. 4,696,715, Cl. 156-568.000.

Bailey, Joe B., Jr., to Shakespeare Company. Reel mount for a fishing rod. 4,696,123, Cl. 43-22.000.

Baker, Alan J. Angle transducer storing an integral number of revolutions' worth of rotor-pole transition data in memory. 4,697,168, Cl. 340-347.00P.

Baker, Geoffrey, to U.S. Philips Corp. Infra-red radiation detector devices. 4,697,081, Cl. 250-338.000.

Baker, Robert C.; and Dishner, Bryan W., to Sundstrand Corporation. Starting system for an electrically-compensated constant speed drive. 4,697,090, Cl. 290-4.00R.

Balaban, Alvin R.; and Steckler, Steven A., to RCA Corporation. Sync separator with periodic updating. 4,697,211, Cl. 358-153.000.

Baldoni, J. Gary: *See—*
Buljan, Sergej-Tomislav; and Baldoni, J. Gary, 4,696,352, Cl. 175-57.000.

Bale, Christopher R.: *See*—
Chard, Brian C.; Hooper, John D.; and Bale, Christopher R., 4,696,311, Cl. 131-109.100.

Ball Corporation: *See*—
Evely, William W., 4,696,636, Cl. 425-526.000.

Ball, Joyce A.; and McKettrick, Glen W. Heated coat liner. 4,696,066, Cl. 2-272.000.

Ballard Medical Products: *See*—
Palmer, Darrel, 4,696,296, Cl. 128-207.160.

Bankuty, Geza E.; and Byron, LeRoy F., to New England Machinery, Inc. Container capper and torque tester. 4,696,144, Cl. 53-331.500.

Barabe, David J. Wound closing method. 4,696,301, Cl. 128-335.500.

Barabino, William A.: *See*—
Cross, Robert J.; and Barabino, William A., 4,696,106, Cl. 30-41.000.

Baratti, James J.; McCollough, Mike; and Gouzoules, Glenn P., to Hughes Aircraft Company. Test/master/slave triple latch flip-flop. 4,697,279, Cl. 377-73.000.

Barbeau, Dennis E., to Teledyne Industries, Inc. Integrated fuel management system. 4,697,238, Cl. 364-431.020.

Barber, Patrick G.; and Simpson, Norman R., to United States of America, National Aeronautics and Space Administration. Procedure to prepare transparent silica gels. 4,696,808, Cl. 423-338.000.

Barbier, Gerard Y. G.; Leboure, Gerald J. P. B.; Desaulty, Michel A. A.; Martinez, Rodolphe; and Perigne, Jerome, to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation "S.N.E.C.-M.A.". Fuel and air injection system for a turbojet engine. 4,696,157, Cl. 60-39.230.

Barkley Corporation: *See*—
Barkley, George J., 4,696,230, Cl. 101-181.000.

Barkley, George J., to Barkley Corporation. Adjustable bustle-forming apparatus for maintaining registration of multicolor images on printing webs. 4,696,230, Cl. 101-181.000.

Barmag AG: *See*—
Lenk, Erich; and Feth, Max, 4,696,633, Cl. 425-192.00S.

Bartelsen, Lutz, to Flachglas Aktiengesellschaft. Process and apparatus for testing transparent material webs, particularly plate glass ribbons. 4,697,082, Cl. 250-341.000.

BASF Aktiengesellschaft: *See*—
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.
Habermann, Wolfgang; Hammes, Peter; Engelhardt, Hubert; Geiger, Wolfgang; Haltrich, Walter; and Simmler, Werner, 4,696,749, Cl. 210-721.000.

Bass, Harold E.; and Bass, Richard E., to Bassco, Inc. Casing pump. 4,696,624, Cl. 417-56.000.

Bass, Richard E.: *See*—
Bass, Harold E.; and Bass, Richard E., 4,696,624, Cl. 417-56.000.

Bassco, Inc.: *See*—
Bass, Harold E.; and Bass, Richard E., 4,696,624, Cl. 417-56.000.

Batori, Sandor: *See*—
Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Pallos, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.

Bauer, Anton E.; Billmann, Gerhard; Rathke, Jorg; Schimanek, Hans-Joachim; Schrott, Georg W.; and Wodok, Hans, to Allied Corporation. Connector for fiber optic cables. 4,696,537, Cl. 350-96.200.

Bauer Bros. Co., The: *See*—
Bouchillon, Charles W., 4,696,737, Cl. 209-210.000.

Bauer, Jurgen: *See*—
Glemser, Oskar; Buss, Dieter H.; and Bauer, Jurgen, 4,696,875, Cl. 429-206.000.

Bauman, Jack: *See*—
Wallace, Robert S., 4,696,401, Cl. 206-594.000.

Baumgartner, Josef: *See*—
Stalder, Herbert; Wurmli, Arthur; Baumgartner, Josef; and Briner, Emil, 4,696,155, Cl. 57-401.000.

Bayer Aktiengesellschaft: *See*—
Spies, Manfred; Strohriegl, Peter; and Heitz, Walter, 4,696,999, Cl. 528-319.000.

Bayless, James D. Car washing mitt. 4,696,593, Cl. 401-7.000.

Beal, Daniel: *See*—
Joliot, A. Pierre; and Beal, Daniel, 4,696,570, Cl. 356-319.000.

Beatty, Marguerite R. Electrically insulative staple. 4,697,045, Cl. 174-159.000.

Beaufoy, Raymond, to Plessey Overseas Limited. Time slot arrangements for local area network systems. 4,697,263, Cl. 370-85.000.

Beckman Instruments, Inc.: *See*—
Gurske, William A., 4,696,958, Cl. 524-21.000.

Beckstein, Hellmut, to Mahlo GmbH + Co. KG. Method and apparatus for controlling the dye receptivity of textiles. 4,696,185, Cl. 73-37.700.

Bedell, Stephen A., to Dow Chemical Company, The. Drilling geothermal wells with removal of H_2S. 4,696,802, Cl. 423-226.000.

Bedford, John A.; Elsohly, Hala N.; Wilson, Marvin C.; and Turner, Carlton E., to University of Mississippi. Anorexic material extracted from coca leaves and method of preparing. 4,696,819, Cl. 424-195.100.

Beecham Group p.l.c.: *See*—
King, Francis D., 4,697,019, Cl. 546-112.000.

Beehler, David E.; Drake, Timothy E.; and Hawk, Timothy E., to Renoid, Inc. Packer/weigh-scale. 4,696,357, Cl. 177-145.000.

Beggs, Richard D.; Friesen, Harold W.; and Nutt, Wendell G., to AT&T Technologies Inc., AT&T Bell Laboratories. Data transmission system. 4,697,051, Cl. 178-63.00D.

Behl, Wishvender K.; and Chin, Der-Tau, to United States of America, Army. Method of making a rotating disk electrode. 4,696,103, Cl. 29-825.000.

Beladi, Ilona: *See*—
Toth, Miklos; Endresz, Valeria; Belsdi, Ilona; and Toth, Sandor, 4,696,899, Cl. 435-68.000.

Bell, Frank A.: *See*—
Harwood, J. Richard; and Bell, Frank A., 4,696,349, Cl. 172-323.000.

Bell & Howell Company: *See*—
Zemke, Edward H., deceased; Vandersyde, Gary L.; Rabindran, K. George; and Guenther, Kenneth L., 4,697,246, Cl. 364-563.000.

Belsole, Susan C., to Warner-Lambert Company. Transdermal delivery system for administration of nitroglycerin. 4,696,821, Cl. 424-448.000.

Belthle, Heinz, to Schaudt Maschinenbau GmbH. Method of profiling and dressing grinding wheels. 4,696,130, Cl. 51-293.000.

Beltronics, Inc.: *See*—
Bishop, Robert, 4,697,088, Cl. 250-561.000.

Bendix Limited: *See*—
Oliver, Patrick R., 4,696,495, Cl. 285-86.000.

Benko, Pal: *See*—
Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Pallos, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.

Bentley, Robert L.; Hoyle, William; and Jack, James, to CIBA-GEIGY Corporation. Compositions containing heterocyclic corrosion inhibitors. 4,696,763, Cl. 252-391.000.

Bentzen, Craig L.; Guyon-Gellin, Yves; Kalathakis, Kyriacos; Phan, Hieu T.; Nguyen Mong, Lan; Niesor, Eric; and Rossier, Jean-Robert, to Symphar S.A. Certain 2-substituted 1,3-propylidenediphosphonate derivatives, pharmaceutical compositions containing them and their use as antihypertensive agents. 4,696,920, Cl. 514-89.000.

Berkline Corporation: *See*—
Burnett, William; Houghton, James R.; Walker, David A.; and Key, Larry, 4,696,512, Cl. 297-68.000.

Bernard, Georges: *See*—
Walter, Jean-Jacques; Petit, Daniel; Marzocca, Joseph; Amalric, Jean; and Bernard, Georges, 4,697,055, Cl. 200-148.00B.

Bernardini, Ronald J., to Litman, Michael, a part interest. Portable heat treatment system. 4,696,303, Cl. 128-402.000.

Berthold, Hans: *See*—
Schauer, Friedrich; and Berthold, Hans, 4,696,523, Cl. 439-11.000.

Bertrand, Jean-Jacques, to Pomagalski S.A. Device for detecting and localizing a fault in an aerial rope-way transport installation. 4,697,169, Cl. 340-540.000.

Better Life International, Inc.: *See*—
Summers, John K., 4,696,315, Cl. 131-359.000.

Beuzard, Yves: *See*—
Sebille, Bernard; Beuzard, Yves; and Demarne, Henri, 4,696,937, Cl. 514-314.000.

Bezler, Wilhelm; and Kobler, Ingo, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Rotary offset printing press equipped for flying plate change. 4,696,229, Cl. 101-177.000.

BICC Public Limited Company: *See*—
Saha, Sanjiv, 4,696,534, Cl. 350-96.150.
Saha, Sanjiv, 4,696,535, Cl. 350-96.150.

Bierhoff, Martinus P. M.: *See*—
Overath, Hilde M. A.; and Bierhoff, Martinus P. M., 4,697,258, Cl. 369-44.000.

Bierhoff, Waltherus C. J.; Schuitmaker, Pieter D.; Ouwerkerk, Cornelis; and Verhoeven, Robertus J. M., to U.S. Philips Corporation. Printer having a guide for an insertable cassette which can hold data and transfer strips. 4,696,590, Cl. 400-613.000.

Bihler, Otto; and Bruller, Eduard, to Bihler, Otto. Wire and band processing machine. 4,696,178, Cl. 72-384.000.

Billiet, Colin T.; Baggett, David; and Fielding, Robert M., to Domnick Hunter Filters Limited. Filters. 4,696,687, Cl. 55-316.000.

Billingsley, Robert H., Jr.; Jantzen, Steven L.; O'Leary, Walter E.; and Krug, John A., to ACF Industries, Incorporated. End structure for railway car. 4,696,238, Cl. 105-248.000.

Billington, Donald G.: *See*—
Gordon, Alan J.; and Billington, Donald G., 4,696,743, Cl. 210-361.000.

Billmann, Gerhard: *See*—
Bauer, Anton E.; Billmann, Gerhard; Rathke, Jorg; Schimanek, Hans-Joachim; Schrott, Georg W.; and Wodok, Hans, 4,696,537, Cl. 350-96.200.

Biochemical Diagnostics, Inc.: *See*—
Kopp, Reiner H.; and Panetz, Allen I., 4,696,187, Cl. 73-61.10C.

Birkle, Siegfried; and Gehring, Johann, to Siemens Aktiengesellschaft. Apparatus for mass electroplating of bulk goods. 4,696,728, Cl. 204-213.000.

Birritella, Mark S.; and Stipanuk, James J., to Motorola, Inc. Bipolar RAM cell. 4,697,251, Cl. 365-154.000.

Bischoff, Gregg C., to Spectrum Control, Inc. Monomer atomizer for vaporization. 4,696,719, Cl. 202-205.000.

Bisconte, Jean-Claude, to Institut National de la Sante et de la Recherche Medicale (INSERM). Modular apparatus for cell culture. 4,696,902, Cl. 435-300.000.

Bishop, Robert, to Beltronics, Inc. Method of and apparatus for discriminating sharp edge transitions produced during optical scanning of differently reflective regions. 4,697,088, Cl. 250-561.000.

Bissinger, Werner D., to International Business Machines Corporation. Process for automatically regenerating copper chloride etch solutions. 4,696,717, Cl. 156-642.000.

Bitzel, Hubert, to Trumpf GmbH & Co. Method and apparatus for nibbling cutouts with rectilinear and curvilinear contours by rotation of tooling with cutting surfaces of rectilinear and curvilinear contours and novel tooling therefor. 4,696,211, Cl. 83-49.000.

Blackburn, Donald, to Oak Ridge Systems, Inc. Device for improving the ignition of fuel-air mixtures in internal combustion engines. 4,696,269, Cl. 123-256.000.

Blanchart, Alain P. O.; and Van Der Poorten, Christian J. E. C., to Electrochemische Energieconversie N.V. (Elenco N.V.). Process for producing a catalytic layer for a fuel cell electrode. 4,696,872, Cl. 429-42.000.

Blanco, Guillermo L.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sunduiqst, Hannu K., 4,696,949, Cl. 514-648.000.

Blank, Robert G.; and Mody, Dhiraj S., to American Home Products Corporation. Stable hydrogen peroxide gels. 4,696,757, Cl. 252-186.290.

Blaw Knox Corporation: *See*—
Royzman, Semyon E., 4,696,458, Cl. 266-212.000.

Bleckmann, Ingo. Tubular heater with an overload safety means. 4,697,069, Cl. 219-517.000.

Bleh, Klaus. Device for washing out organic loam-like impurities from continuously fed large and fine granular solids. 4,696,736, Cl. 209-173.000.

Blendax-Werke R. Schneider GmbH & Co.: *See*—
Kuhlmann, Werner, 4,696,955, Cl. 522-77.000.

Blickenderfer, Jack L.: *See*—
Tolino, Ralph W.; King, William E.; Blickenderfer, Jack L.; and Roth, Charles H., Jr., 4,696,784, Cl. 376-245.000.

Blohm & Voss AG: *See*—
Wagemann, Harry, 4,696,651, Cl. 440-88.000.

Bloom, Stanley: *See*—
Alig, Roger C.; Bloom, Stanley; and Hockings, Eric F., 4,697,120, Cl. 313-412.000.

Blytas, George C.; Grimsby, F. Norman; and Scamehorn, John F., to Shell Oil Company. Process for the production of dichlorohydrin. 4,696,726, Cl. 204-182.400.

Boains, Maurice, Jr. Lawn mower blade safety assembly. 4,696,153, Cl. 56-295.000.

Board of Governors of Ryerson Polytechnical Institute, The: *See*—
Woo, Kenneth; and Mamak, Z., 4,696,449, Cl. 248-553.000.

Boboli, Inc.: *See*—
DeChristopher, Eugene L., 4,696,823, Cl. 426-496.000.

BOC Group, Inc., The: *See*—
LLoyd-Williams, Andrew, 4,696,681, Cl. 55-28.000.

Bode-Panzer: *See*—
Maxeiner, Heinz, 4,696,240, Cl. 109-82.000.

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Bodson, Guy: *See*—
Gobert, Jean; Giurgea, Corneliu; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,942, Cl. 514-424.000.
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Leinert, Herbert, 4,697,022, Cl. 548-444.000.

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Gorges, Frederick J., 4,696,583, Cl. 384-49.000.
Mazzitelli, Frederick, 4,696,442, Cl. 244-53.00B.

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Boesger, Leonard E.: *See*—
Elmquist, Steven A.; and Boesger, Leonard E., 4,696,353, Cl. 175-206.000.

Bogsch, Erik: *See*—
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Bohan, John E., Jr., to Honeywell Inc. Self-energizing burner control system for a fuel burner. 4,696,639, Cl. 431-59.000.

Bohme, Helmut; Lobl, Helmut; and Grossmann, Steffen, to VEB "Otto-Buchwitz" Starkstrom-Anlagebau Dresden. Plug-in type contact arrangement. 4,696,531, Cl. 439-851.000.

Bolmstedt, Ulf; and Johansson, Bjorn-Olow, to Alfa-Laval Food and Dairy Engineering AB. Device for changing the number of part streams of a flowing medium. 4,696,341, Cl. 165-101.000.

Bolzan, Louis F., to Stauffer Chemical Company. Process for producing a disulfide dimer of EPTD. 4,697,028, Cl. 558-89.000.

Bolze, Rudolf: *See*—
Russe, Meinhard W.; Bolze, Rudolf; and Koch, Friedhelm, 4,696,914, Cl. 514-19.000.

Bonaccio, Anthony R., to International Business Machines Corporation. Open line detector circuit. 4,697,099, Cl. 307-355.000.

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Bossanszky, Ferenc: *See*—
Szody, Peter; Dunajcsik, Peter; Villanyi, Miklos; Bossanszky, Ferenc; Libor, Endre; and Kiss, Ferenc, 4,696,643, Cl. 432-120.000.

Bost, Michel, to Aerospatiale Societe Nationale Industrielle. Helicopter rotor blade made from a multispar composite material with torsion compartments and a process for manufacturing same. 4,696,623, Cl. 416-230.000.

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Cousin, Stephane; and Boumendil, Jean-Paul, 4,696,847, Cl. 428-76.000.

Bourland, Larry G., to Atlantic Richfield Company. Polymeric molding composition containing styrenic copolymer, polycarbonate and MBS polymer. 4,696,972, Cl. 525-67.000.

Bourque, Robert F., to GA Technologies Inc. Composite first wall for fusion device. 4,696,781, Cl. 376-136.000.

Boyadjieff, George I., to Varco International, Inc. Well pipe handling machine. 4,696,207, Cl. 81-57.340.

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Boyesen, Eyvind, to Performance Industries, Inc. Reed valves for internal combustion engines. 4,696,263, Cl. 123-65.00V.

Boytor, Samuel G.; and Jurs, Jeffry W., to F. J. Littell Machine Company. Machine control system. 4,697,231, Cl. 364-188.000.

BP Performance Polymers Inc.: *See*—
Shedd, Charles D.; and Anzini, David J., 4,696,967, Cl. 524-437.000.

Brace, R. Lyle. Hydraulic power transmission system. 4,696,148, Cl. 60-489.000.

Brammer, Norman, to Vetco-Gray Inc. Subsea wellhead tieback system. 4,696,493, Cl. 285-3.000.

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Olschewski, Armin; Brandenstein, Manfred; Hetterich, Hermann; and Kunkel, Heinrich, 4,696,083, Cl. 29-148.40C.

Brandon, George M., to Textron, Inc. Electronic voltage regulator. 4,697,135, Cl. 322-24.000.

Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, to BASF Aktiengesellschaft. Preparation of polyphenylene ethers, and an apparatus for this purpose. 4,696,996, Cl. 528-214.000.

Brautigam, Peter F., to Deere & Company. Device holding seat in raised position. 4,696,508, Cl. 296-65.00R.

Brehm, Norbert O.: *See*—
Richardson, Eugene M.; Brehm, Norbert O.; and Null, Larry G., 4,696,377, Cl. 188-170.000.

Breil, Daniela: *See*—
Haubennestel, Karlheinz; Breil, Daniela; Bubat, Alfred; and Spratte, Werner, 4,696,761, Cl. 252-358.000.

Brejnak, Jacek: *See*—
Traczyk, Jan; Brejnak, Jacek; and Kawalec, Krzysztof, 4,696,622, Cl. 415-211.000.

Brewer, John H.; and Foster, Terry L., to Science Research Center, Inc. Identification of reagins in the blood serum of allergen sensitized vertebrates. 4,696,907, Cl. 436-513.000.

Breya, Edward F., to Tektronix, Inc. Mounting method for electrical components having connections both on and off a circuit board. 4,696,105, Cl. 29-840.000.

Brickl, Rolf: *See*—
Schepky, Gottfried; Brickl, Rolf; Rupprecht, Eckhard; and Greischel, Andreas, 4,696,815, Cl. 424-80.000.

Bridgestone Corp.: *See*—
Shimomura, Kenji; Kouketsu, Shigeaki; Okuyama, Toru; and Sato, Take, 4,696,952, Cl. 521-107.000.
Tomita, Seisuke; and Egashira, Yoshinori, 4,696,475, Cl. 273-227.000.
Tsukagoshi, Tetsuhito; Matsunuma, Tamotsu; and Makino, Shigeo, 4,696,335, Cl. 152-535.000.

Brimeyer, Dennis A.: *See*—
Ruhter, Martin L.; Brimeyer, Dennis A.; and Stubben, David W., 4,696,350, Cl. 172-793.000.

Briner, Emil: *See*—
Stalder, Herbert; Wurmli, Arthur; Baumgartner, Josef; and Briner, Emil, 4,696,135, Cl. 57-401.000.

Brinton, Charles C.; and McMichael, John C., to Bactex, Inc. Gonococcal Pili processes for the preparation thereof and the use thereof for the detection of and prevention of infections caused by *Neisseria gonorrhoeae*. 4,696,896, Cl. 435-7.000.

Brisson, Alfred G.: *See*—
Shene, William R.; Nowacki, Christopher; and Brisson, Alfred G., 4,696,299, Cl. 128-328.000.

Bristol-Myers Company: *See*—
Puski, Gabor; Hartman, Grant H., Jr.; and Talbott, Robert D., 4,697,004, Cl. 530-378.000.

British-American Tobacco Company Limited: *See*—
Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., 4,696,313, Cl. 131-291.000.

Brooks, Edward, to Houton Manufacturing Co., Inc. Axially compact brake. 4,696,378, Cl. 188-170.000.

Brooks, Timothy K.: *See*—
Genereaux, Eugene P.; Jameson, Samuel M.; and Brooks, Timothy K., 4,696,460, Cl. 269-6.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Horie, Fujio, 4,696,247, Cl. 112-315.000.
Tatematsu, Hiromu; and Miyabayashi, Takeshi, 4,696,861, Cl. 428-328.000.

Brown, Boveri & Cie AG: *See*—
Hochreuther, Karl, 4,696,189, Cl. 73-431.000.

Brown, Ian C.; Hedge, Roger W.; and Molyneux, David J., to British-American Tobacco Company Limited. Expansion of tobacco. 4,696,313, Cl. 131-291.000.

Brown, Lawrence H., to L. H. Brown, Inc. Jaw locking means for chucks. 4,696,482, Cl. 279-1.05J.

Brown, Mark D. Method for treating intervertebral disc displacement with enzymes. 4,696,816, Cl. 424-94.000.

Bruker Medizintechnik GmbH: *See*—
Strobel, Bernhard; and Ratzel, Dieter, 4,697,148, Cl. 324-309.000.

Bruller, Eduard: *See*—
Bihler, Otto; and Bruller, Eduard, 4,696,178, Cl. 72-384.000.

Brunelle, Daniel J.; Guggenheim, Thomas L.; Boden, Eugene P.; Shannon, Thomas G.; and Guiles, Joseph W., to General Electric Company. Cyclic heterocarbonates and methods for their preparation and use. 4,696,998, Cl. 528-272.000.

Brunelle, Philip E.; and Southerland, Bob R., to Storage Technology Corporation. I/O device reconnection in a multiple-CPU, dynamic path allocation environment. 4,697,232, Cl. 364-200.000.

Bryan, Paul J., to Du Pont de Nemours, E. I., and Company. Shock-resistant delay detonator. 4,696,231, Cl. 102-202.500.

Bubat, Alfred: *See*—
Haubennestel, Karlheinz; Breil, Daniela; Bubat, Alfred; and Spratte, Werner, 4,696,761, Cl. 252-358.000.

Bucher, George D.; Catanese, John A.; and Clawson, William D., to Westinghouse Electric Corp. Tube straightness checking apparatus. 4,696,190, Cl. 73-865.800.

Bucher, Jakob, to M.A.N.-B&W Diesel GmbH. Supercharging system for an internal combustion engine. 4,696,165, Cl. 60-609.000.

Buchmann, Rainer: *See*—
Roggendorf, Peter; and Buchmann, Rainer, 4,697,092, Cl. 307-10.00R.

Buckshaw, Thomas M.; and Llewellyn, David T., to Robertshaw Controls Company. Water level control device and method of making the same. 4,696,204, Cl. 74-567.000.

Budapest Muszaki Egyetem: *See*—
Szody, Peter; Dunajcsik, Peter; Villanyi, Miklos; Bossanszky, Ferenc; Libor, Endre; and Kiss, Ferenc, 4,696,643, Cl. 432-120.000.

Buddecke, Charles L.; and Graham, Robert F., Jr., to Hughes Aircraft Company. Inherently flat spectral density pseudorandom noise generator. 4,697,157, Cl. 331-78.000.

Buhr, Gerhard, to Hoechst Aktiengesellschaft. Light-sensitive compounds possessing trichloromethyl groups, a process for their production and light-sensitive mixtures containing these compounds. 4,696,888, Cl. 430-270.000.

Bukoschek, Romuald L.; and Huszar, Reinhard, to U.S. Philips Corporation. Ice-cream maker. 4,696,166, Cl. 62-136.000.

Buljan, Sergej-Tomislav; and Baldoni, J. Gary, to GTE Laboratories Incorporated. Insert for a drilling tool bit and a method of drilling therewith. 4,696,352, Cl. 175-57.000.

Bull, Walter E., to Wilkerson Corporation. Pressure control valve with push-pull locking adjustment knob. 4,696,320, Cl. 137-116.500.

Bullock, Christopher A. Insulation configurations and method of increasing insulation efficiency. 4,696,138, Cl. 52-407.000.

Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Method and apparatus for forming containers. 4,696,177, Cl. 72-379.000.

Bunge, Richard H.; French, James C.; Hurley, Timothy R.; and Willmer, Neil E., to Warner-Lambert Company. CL-1957D antibiotic compound and its production. 4,696,794, Cl. 424-118.000.

Bunz, Lewis A.: *See*—
Schachter, Rozalie; Viscogliosi, Marcello; Bunz, Lewis A.; Olego, Diego J.; Serreze, Harvey B.; and Raccah, Paul M., 4,696,828, Cl. 427-38.000.

Buoli, Carlo, to 501 GTE Telecomunicazioni S.p.A. Directional couplers of the branchline type. 4,697,161, Cl. 333-116.000.

Burks, Arthur W.: *See*—
Holland, John H.; and Burks, Arthur W., 4,697,242, Cl. 364-513.000.

Burkum, Merlin E.; and Gabriel, Charles M., to Commonwealth Edison Company. Apparatus and method for measuring battery condition. 4,697,134, Cl. 320-48.000.

Burnett, William; Houghton, James R.; Walker, David A.; and Key, Larry, to Berkline Corporation. Motorized recliner chair with release mechanism. 4,696,512, Cl. 297-68.000.

Burr, Donald N.; Danilowicz, Paul S.; Franz, Thomas C.; Mortimer, Thomas P.; and Pero, Edward B., to United Technologies Corporation. Fuel and oil heat management system for a gas turbine engine. 4,696,156, Cl. 60-39.080.

Bushey, Thomas P.: *See*—
McLaughlin, Kevin L.; and Bushey, Thomas P., 4,696,097, Cl. 437-193.000.

Buss, Dieter H.: *See*—
Glemser, Oskar; Buss, Dieter H.; and Bauer, Jurgen, 4,696,875, Cl. 429-206.000.

Butler, Gregg A., to Analog Devices, Inc. Method and apparatus for testing operational amplifier leakage current. 4,697,151, Cl. 330-2.000.

Butler, Jerry F.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,696,676, Cl. 44-7.500.

Butler, Major G., to Butler Taper Joint. Mechanical pipe joint and method of forming the same. 4,696,499, Cl. 285-234.400.

Butler Taper Joint: *See*—
Butler, Major G., 4,696,499, Cl. 285-234.400.

Butler, Thomas A.: *See*—
Moore, William H.; Gutowski, Charles M.; Trosky, William J.; and Butler, Thomas A., 4,697,243, Cl. 364-513.000.

Butts, Gene A.; Kelley, Charles D.; Garsee, Henry A.; Petty, Bruce R.; and Pauley, James L., to Helena Laboratories Corporation. Densitometer with automatic gain and reference value adjustment of analog waveform. 4,697,236, Cl. 364-416.000.

Buxe, Paul M., to United Technologies Corporation. Augmentor liner support band having finger positioners. 4,696,431, Cl. 239-265.150.

Byk-Chemie GmbH: *See*—
Haubennestel, Karlheinz; Breil, Daniela; Bubat, Alfred; and Spratte, Werner, 4,696,761, Cl. 252-358.000.

Byrne, Brian, to Hercules Incorporated. Carboxylate salt compound and method for flavoring foodstuffs and tobacco. 4,697,025, Cl. 556-183.000.

Byron, LeRoy F.: *See*—
Bankuty, Geza E.; and Byron, LeRoy F., 4,696,144, Cl. 53-331.500.

C&M Custom and Portable Kennels, Inc.: *See*—
Fewox, Cary M., 4,696,259, Cl. 119-19.000.

C O D Inter Techniques SA: *See*—
Horvah, Laszlo S., 4,696,351, Cl. 173-32.000.

Caccamo, Anthony F.: *See*—
Noonan, John M.; and Caccamo, Anthony F., 4,696,990, Cl. 526-304.000.

Cadaureille, Gerard: *See*—
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, 4,696,786, Cl. 376-245.000.

Cael, John J., to Polaroid Corporation. Photopolymerizable composition. 4,696,876, Cl. 430-1.000.

Cain, Charles E.; and Cain, Gary L., to Chief Technology Systems, Inc. Two hole automatic precision punch. 4,696,210, Cl. 83-33.000.

Cain, Gary L.: *See*—
Cain, Charles E.; and Cain, Gary L., 4,696,210, Cl. 83-33.000.

Calenda, Ciro: *See*—
De Filippis, Pietro; Calenda, Ciro; Notaro, Giuseppe; and Boulanger, Henry, 4,696,579, Cl. 374-187.000.

Callaham, William T.: *See*—
Turano, Louis R.; Callaham, William T.; Sherwood, John F.; and Thatcher, Richard E., 4,696,312, Cl. 131-109.100.

Callahan, Michael. Control system for variable parameter fixtures. 4,697,227, Cl. 362-233.000.

Cameron Iron Works, Inc.: *See*—
Schmitz, Thomas R.; and Taylor, William M., 4,696,494, Cl. 285-18.000.

Campbell, Curtis B., to Chevron Research Company. Lubricating oil compositions containing hydroxy polyether polyamines. 4,696,755, Cl. 252-515.00R.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See*—
Thomas, David M.; and Tubb, Leonard J., 4,697,185, Cl. 342-185.000.

Canon Kabushiki Kaisha: *See*—
Harigaya, Isao; and Takahashi, Kouji, 4,696,440, Cl. 242-191.000.
Hattori, Jun; and Suda, Shigeyuki, 4,696,552, Cl. 350-413.000.
Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, 4,697,196, Cl. 346-159.000.
Kaneko, Norio; and Niibe, Masahito, 4,697,222, Cl. 361-321.000.
Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, 4,696,881, Cl. 430-57.000.
Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, 4,696,882, Cl. 430-57.000.
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Saitoh, Keishi; Kanai, Masahiro; Sueda, Tetsuo; Misumi, Teruo; Tsuezuki, Yoshio; and Ogawa, Kyosuke, 4,696,884, Cl. 430-58.000.
Tsuji, Sadahiko; Takahashi, Sadatoshi; and Fujibayashi, Kazuo, 4,696,553, Cl. 350-427.000.

Cantatore, Giuseppe, to Ciba-Geigy Corporation. Polymeric compounds containing piperidine radicals and their use as stabilizers for synthetic polymers. 4,696,961, Cl. 524-100.000.

Capdepuy, Bernard: *See*—
Minjolle, Louis; Drouet, Claudette; Hordonneau, Alain; and Capdepuy, Bernard, 4,696,710, Cl. 156-89.000.

Carbonaro, Antonio; and Ferraro, Domenico, to Enichem Elastomeri, S.p.A. Isoprene polymerization process. 4,696,984, Cl. 526-98.000.

Carl Freudenberg, Firma: *See*—
Jost, Manfred; Knoke, Jurgen; Yoshida, Zenji; Ohta, Noburo; and Nakanishi, Terumo, 4,696,850, Cl. 428-197.000.

Carlson, Daniel J.: *See*—
Hofer, Dean A.; Carlson, Daniel J.; and Pecak, Matthew L., 4,697,192, Cl. 343-895.000.

Carnes, Wendall D.: *See—*
Anderson, Richard V.; and Carnes, Wendall D., 4,696,343, Cl. 166-164.000.

Carr, Ronald H.: *See—*
Paul, Gary E.; Carr, Ronald H.; and Stern, Lee W., 4,696,793, Cl. 376-447.000.

Cascade Microtech, Inc.: *See—*
Lockwood, Larry R.; Gleason, Kimberly R.; and Strid, Eric W., 4,697,143, Cl. 324-158.00P.

Casey, Robert, to Dover Corporation. Dolly for towing vehicles. 4,696,484, Cl. 280-43.160.

Casio Computer Co., Ltd.: *See—*
Hara, Kazuya, 4,697,073, Cl. 235-487.000.
Kawana, Shigeyuki, 4,697,072, Cl. 235-380.000.
Sasakawa, Hirotaka, 4,697,214, Cl. 360-85.000.

Castaldi, Graziano: *See—*
Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, 4,697,036, Cl. 562-418.000.

Catanese, John A.: *See—*
Bucher, George D.; Catanese, John A.; and Clawson, William D., 4,696,190, Cl. 73-865.800.

Caterpillar Inc.: *See—*
Vize, Robert M., 4,696,409, Cl. 220-203.000.

Cavalli, Alfredo. Multi-purpose household appliance particularly for cleaning floors, carpets, laid carpetings, and the like. 4,696,074, Cl. 15-321.000.

Cavicchioli, Silvia: *See—*
Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, 4,697,036, Cl. 562-418.000.

CBIT Corporation: *See—*
Kara, Gerald F.; and Sawyer, William H., 4,697,245, Cl. 364-552.000.

Cedar, Dennis A.; and Miller, Ralph L., to Modern Engineering Service Company. Method for making models using simultaneous construction and CAD/CAM techniques. 4,697,240, Cl. 364-474.000.

Central Glass Company, Limited: *See—*
Miyata, Seizo; Nakahama, Hidenari; and Kasuga, Takeshi, 4,696,838, Cl. 427-407.200.

Centre National de la Recherche Scientifique: *See—*
Vialaron, Andre ; Olalde, Gabriel; and Gauthier, Daniel, 4,696,809, Cl. 423-579.000.

Centre National de la Recherche Scientifique (C.N.R.S.): *See—*
Joliot, A. Pierre; and Beal, Daniel, 4,696,570, Cl. 356-319.000.

Centre National d'Etudes Spatiales (C.N.E.S.): *See—*
Regipa, Robert, 4,696,444, Cl. 244-127.000.

Cermak, Jan: *See—*
Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , 4,696,683, Cl. 55-82.000.

Ceskoslevenska Akademie Ved: *See—*
Sulc, Jiri ; Vondracek, Petr; and Lopour, Petr, 4,696,974, Cl. 525-92.000.

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Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , 4,696,683, Cl. 55-82.000.

Chaffy, Joseph; and Langon, Bernard, to Aluminium Pechiney. Circuit for the electrical connection of rows of electrolysis cells for the production of aluminum at very high current. 4,696,730, Cl. 204-243.00M.

Chan, Peter S., to American Cyanamid Company. Method for treating hypertension using 3-(4-imidazolylmethylene)-carbazic and dithiocarbazic acid esters. 4,696,940, Cl. 514-400.000.

Chang, Clarence D.: *See—*
Chu, Cynthia T-W; and Chang, Clarence D., 4,696,807, Cl. 423-305.000.

Chang, Wen-Hsuan; Chau, Michael M.; and Piccirilli, Robert, to PPG Industries, Inc. Modified piperidines as ultraviolet light stabilizers. 4,696,959, Cl. 524-91.000.

Chappell, Barbara A.; and Schuster, Stanley E., to International Business Machines Corp. Complementary input circuit with nonlinear front end and partially coupled latch. 4,697,108, Cl. 307-475.000.

Chard, Brian C.; Hooper, John D.; and Bale, Christopher R., to Imperial Group Public Limited Company. Forming a rod of smokable material. 4,696,311, Cl. 131-109.100.

Chau, Michael M.: *See—*
Chang, Wen-Hsuan; Chau, Michael M.; and Piccirilli, Robert, 4,696,959, Cl. 524-91.000.

Cheal, James; Fitzsimmons, James R.; and Foley, Edward J., to Southwest Microwave. Intrusion detection radar system with amplitude and frequency carrier modulation to eliminate targets at short and long ranges. 4,697,184, Cl. 342-28.000.

Chevron Research Company: *See—*
Campbell, Curtis B., 4,696,755, Cl. 252-515.00R.
Hsueh, Limin, 4,696,345, Cl. 166-245.000.
Thompson, Robert E., 4,696,542, Cl. 350-96.230.
Williamson, Roger C.; and Harrison, James J., 4,697,040, Cl. 585-666.000.

Chief Technology Systems, Inc.: *See—*
Cain, Charles E.; and Cain, Gary L., 4,696,210, Cl. 83-33.000.

Child, Ralph G.; Fields, Thomas L.; Wilkinson, Raymond G.; and Lin, Yang-I, to American Cyanamid Company. 3,6-bis (substituted) acridine N-oxides and N,N-dioxides and methods of restoring, stimulating or enhancing the immune system with them. 4,696,936, Cl. 514-297.000.

Chin, Albert K., to Fogarty, Thomas J. Thermodilution flow-directed catheter assembly and method. 4,696,304, Cl. 128-673.000.

Chin, Der-Tau: *See—*
Behl, Wishvender K.; and Chin, Der-Tau, 4,696,103, Cl. 29-825.000.

Chisholm, Donald P., Jr., to Specialty Equipment Corporation. Cage roll assembly. 4,696,392, Cl. 198-836.000.

Chisso Corporation: *See—*
Isoyama, Toyoshiro; Yasuyuki, Goto; Ogawa, Tetsuya; and Sugimori, Shigeru, 4,696,759, Cl. 252-299.620.

Chizever, Gary E.: *See—*
Goff, Jerry K.; and Chizever, Gary E., 4,697,125, Cl. 318-254.000.

Chou, Shine K., to Monsanto Company. Amine oxidation using carbon catalyst having oxides removed from surface. 4,696,772, Cl. 260-502.50F.

Christensen, Burton G.; and Shih, David H., to Merck & Co., Inc. 6-[1-hydroxyethyl]-2-SR*-1-methyl-1-carbadethiapen-2-em-3-carboxylic acids. 4,696,923, Cl. 514-210.000.

Christis, Wilhelmus J.: *See—*
Geerings, Michael P. W.; Christis, Wilhelmus J.; Fekkes, Wilhelmus F.; and Schmitz, Herman J. R., 4,697,046, Cl. 178-1.000.

Chronar Corp.: *See—*
Ellis, Frank B., Jr.; and Delahoy, Alan E., 4,696,702, Cl. 437-88.000.

Chu, Cynthia T-W; and Chang, Clarence D., to Mobil Oil Corporation. Crystalline microporous oxide MCM-21 and process for its preparation. 4,696,807, Cl. 423-305.000.

Chu, Yung F.: *See—*
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Pfeifer, Josef, 4,696,890, Cl. 430-325.000.
Ravichandran, Ramanathan, 4,696,964, Cl. 524-236.000.
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Storni, Angelo; and Meisels, Alex, 4,697,020, Cl. 548-184.000.
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Ortwein, Hermann, 4,696,429, Cl. 238-2.000.

Cloyd, William C., to Custom Tool & Mfg. Co.; and Automation Development Corporation, part interest to each. Robot arm coupling apparatus. 4,696,524, Cl. 439-197.000.

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Oswald, Gordon K. A., 4,697,190, Cl. 343-719.000.
Coan, Michael H., to Miles Laboratories, Inc. Method of preparing alpha-1-proteinase inhibitor. 4,697,003, Cl. 530-380.000.
Cochrum, Kent C., to University of California, The Regents of the. Coated transplants and method for making same. 4,696,286, Cl. 128-1.00R.
Cohen, Louis, to B. F. Goodrich Company, The. Polymerization reactor coatings and use thereof. 4,696,983, Cl. 526-62.000.
Cole, Stephen C., to Ancra Corporation. Pallet restraint mechanism for cargo loading system. 4,696,609, Cl. 410-69.000.
Colegrove, George T.; and Clare, Kenneth, to Merck & Co., Inc. Quaternary ammonium salts of anionic gums. 4,696,677, Cl. 44-51.000.
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Nedoluha, Heinz F., 4,696,248, Cl. 114-39.000.
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Snipes, Carl E.; and Coleman, John S., 4,696,817, Cl. 424-123.000.
Coller, James R.; and Goodman, Joseph R., to AMP Incorporated. Socket for stacking integrated circuit packages. 4,696,525, Cl. 439-69.000.
Collin, Andre; and Wautier, Henri, to Solvay & Cie. (Societe Anonyme). Phosphobrominated polyetherpolyols and processes for production thereof. 4,697,029, Cl. 558-92.000.
Collodel, Zurino P., to Singer Company, The. Pneumatic actuated cam driven parallel gripper. 4,696,503, Cl. 294-88.000.
Combustion Control Developments, Ltd.: *See*—
Lindberg, John E., 4,696,279, Cl. 123-570.000.
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Overbay, Mark A., 4,696,102, Cl. 29-726.000.
COMER S.p.A.: *See*—
Fabbri, Fabrizio, 4,696,199, Cl. 74-417.000.
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Germond, Jean-Claude; and Clement, Gilles, 4,696,612, Cl. 414-8.000.
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Ness, John B., 4,697,189, Cl. 343-700.0MS.
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Fonfria, Robert; Risbet, Marie P.; and Zattara, Jean L., 4,696,082, Cl. 29-25.420.
Compat Aktiengesellschaft, Firma: *See*—
Sauder, Karl, 4,696,085, Cl. 29-237.000.
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Weber, Otto K.; and Rhee, Sang S., 4,697,077, Cl. 250-231.0SE.
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Hoffman, George J., 4,696,112, Cl. 33-304.000.
Conneally, Martin L., to Sears, Roebuck & Co. Tool fine adjustment mechanism. 4,696,213, Cl. 83-438.000.
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Larson, Richard I.; Ringle, Richard P.; Connolly, John D., Jr.; and Gallivan, Timothy J., 4,696,769, Cl. 252-638.000.
Conrad, George M.; and Smalley, Kenneth M., to Raytheon Company. High voltage solid state switch. 4,697,096, Cl. 307-246.000.
Conroy, Gary M.; and Wursthorn, Karl R., to Morton Thiokol, Inc. Lubricant-stabilizer compositions for halogen-containing organic polymers and polymer compositions thereof. 4,696,754, Cl. 252-40.500.
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Johnson, Howard B., 4,696,455, Cl. 266-44.000.
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Umland, Henning; and Fricke, Gerhard, 4,696,753, Cl. 252-26.000.
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Thomas, David M.; and Tubb, Leonard J., 4,697,185, Cl. 342-185.000.
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Cook, Douglas R.: *See*—
Sander, Eugene H.; and Cook, Douglas R., 4,696,762, Cl. 252-311.000.
Cook, Steven T.; and Wynn, David K., to Dayton Reliable Tool & Mfg. Co. Air assist means for use in transferring relatively flat objects. 4,696,179, Cl. 72-405.000.
Cooper Industries, Inc.: *See*—
Harnois, Carey D., 4,696,528, Cl. 439-160.000.
Cordier, Jean, to Union Siderurgique du Nord et de l'Est de la France (USINOR). Electrode structure for a bath of molten metal. 4,697,273, Cl. 373-72.000.
Corella, Arthur P. Heat sealed package with perforated compartment seal. 4,696,404, Cl. 206-604.000.
Cormack, Owen R.; and Keane, James H. Spatter guard for paint rollers. 4,696,072, Cl. 15-248.00A.
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Schmitt, Paul S., 4,696,692, Cl. 65-102.000.
Cosco, Inc.: *See*—
Maloney, Kevin, 4,696,514, Cl. 297-284.000.
Costella, James G., to Olympus Corporation. Fiberscopic device for inspection of internal sections of construction, and method for using same. 4,696,544, Cl. 350-96.260.
Courtesy Mold & Tool Corporation: *See*—
Kreiseder, Walter J., 4,696,410, Cl. 220-267.000.
Cousin, Stephane; and Boumendil, Jean-Paul, to Isover Saint-Gobain. Insulating and impervious roofing panels. 4,696,847, Cl. 428-76.000.
Cox, Harold S., to Roboserve Limited. Substantially static-free, cellular expanded or foamed thermoplastic articles, including cups and containers, and processes for the manufacture of these articles including the manufacture of intermediate materials suitable for use in such manufacture. 4,696,950, Cl. 521-57.000.
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Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, 4,696,671, Cl. 604-67.000.
Crenshaw, Michael E.: *See*—
Daigle, Richard A., Sr.; Stanfield, William G.; and Crenshaw, Michael E., 4,696,602, Cl. 405-205.000.
Cross, Carroll N. Desk calendar. 4,696,118, Cl. 40-120.000.
Cross, Marshall W., to Science Applications International Corporation. Omniazimuthal antenna. 4,697,191, Cl. 343-809.000.
Cross, Robert J.; and Barabino, William A., to Barabino, William A. Single use disposable medical razor. 4,696,106, Cl. 30-41.000.
Crosthwaite, Robert P., to Ducan Steel Benders Ltd. Sofa bed. 4,696,069, Cl. 5-37.00R.
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Goldberg, Marvin C.; Cunningham, Kirkwood M.; and Weiner, Eugene R., 4,696,571, Cl. 356-336.000.
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Halasa, Adel F.; and Cunningham, Robert E., 4,696,986, Cl. 526-181.000.
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Sims, Richard E., 4,696,547, Cl. 350-319.000.
Curtis, Marland. Bulk conveyor. 4,696,390, Cl. 198-823.000.
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Kallinger, Franz; and Killion, Mark E., 4,696,135, Cl. 52-121.000.
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Cloyd, William C., 4,696,524, Cl. 439-197.000.
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Davy, Peter G.; and Cuthbertson, Brian G., 4,697,229, Cl. 363-49.000.
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Wright, William M. D., 4,696,832, Cl. 427-58.000.
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Yeum, Hee-Sung, 4,696,516, Cl. 297-458.000.
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Asano, Hideharu; and Senda, Hisakazu, 4,697,008, Cl. 536-89.000.
Daigle, Richard A., Sr.; Stanfield, William G.; and Crenshaw, Michael E., to LTV Energy Products Company. Apparatus and system for flooding submerged structures. 4,696,602, Cl. 405-205.000.
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Oka, Masahiko; Ueta, Yutaka; Kano, Hideo; Tomoda, Masayasu; and Kawachi, Shoji, 4,696,989, Cl. 526-254.000.
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Weller, Karl-Heinz R., 4,696,225, Cl. 98-2.110.
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Ooka, Masataka; Okuda, Yaeko; and Kunugiza, Motoyasu, 4,696,975, Cl. 525-113.000.
Daly, John W.: *See*—
Jacobson, Kenneth A.; Daly, John W.; and Kirk, Kenneth L., 4,696,932, Cl. 514-263.000.
Damiani, Martin R.: *See*—
Murdock, Keith C.; Damiani, Martin R.; and Durr, Frederick E., 4,696,935, Cl. 514-297.000.
Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., to Exxon Production Research Company. Compliant offshore platform. 4,696,603, Cl. 405-227.000.
D'Andrade, Bruce M.; and Marino, Joseph A. Toy vehicle with adjustable suspension system. 4,696,655, Cl. 446-330.000.
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Rasmussen, Ivar; and Pedersen, Poul H. H., 4,696,161, Cl. 60-384.000.
Danilowicz, Paul S.: *See*—
Burr, Donald N.; Danilowicz, Paul S.; Franz, Thomas C.; Mortimer, Thomas P.; and Pero, Edward B., 4,696,156, Cl. 60-39.080.
Danner, Bernard; and Ruynon, James R., to Sandoz Ltd. Hydrophilic cationic copolymers of acrylamide or methacrylamide. 4,696,962, Cl. 524-140.000.
Dappert, Thomas O.: *See*—
Magrath, Joseph M.; Tice, Thomas R.; Meyers, William E.; and Dappert, Thomas O., 4,696,258, Cl. 119-1.000.
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Saupe, Martin; Dauernheim, Hans; and Markl, Maximillian, 4,696,645, Cl. 433-125.000.
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Davenport, George F., to Exxon Production Research Company. Articulated compliant offshore structure. 4,696,601, Cl. 405-202.000.
David, Bernard; and Tetard, Roger. Screen process printing machine. 4,696,228, Cl. 101-123.000.
David, Peggy F. M., to Kartell SpA. Device for producing a gas-and-liquid mixture. 4,696,775, Cl. 261-1.000.

Davies, Ronald C., to Digital Products Corporation. Electronic coin detection apparatus. 4,696,385, Cl. 194-319.000.

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Pettit, Harold W., Jr; Davis, Charles G.; and Walden, Frederick C., 4,696,855, Cl. 428-312.800.

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Cook, Steven T.; and Wynn, David K., 4,696,179, Cl. 72-405.000.

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Fischer, Robert; and de Ahna, Dieter, 4,696,700, Cl. 106-291.000.

Dean, Barry D., to Atlantic Richfield Company. Modified acrylic polymers. 4,696,978, Cl. 525-205.000.

DeChristopher, Eugene L., to Boboli, Inc. Method of making a pizza-type product of dough. 4,696,823, Cl. 426-496.000.

Decker, Dale D.; and Stanhope, Mary E., to International Business Machines Corporation. Document reading envelope depository. 4,696,426, Cl. 232-43.100.

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Brautigam, Peter F., 4,696,508, Cl. 296-65.00R.
Delfs, Larry M., 4,696,367, Cl. 180-306.000.
Durchenwald, Larry D., 4,696,387, Cl. 198-394.000.
Marks, Jeffrey C., 4,696,205, Cl. 74-767.000.
Murphy, Kenneth E.; Martin, Ronald A.; and Nies, Gary M., 4,696,660, Cl. 464-170.000.
Ruhter, Martin L.; Brimeyer, Dennis A.; and Stubben, David W., 4,696,350, Cl. 172-793.000.
Ruhter, Martin L., 4,696,486, Cl. 280-400.000.
Russ, Roger A.; and Hennen, John J., 4,696,432, Cl. 241-101.700.

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Degeilh, Robert, to Saint Gobain Vitrage. Process for the preparation of polyvinyl butyral having improved properties. 4,696,971, Cl. 525-61.000.

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Deguchi, Takenori; Uchida, Kazuko; Ikita, Takao; Maruhaski, Shigeaki; Hoshino, Kazuo; and Oosaki, Keiji, to Nisshin Steel Co., Ltd. Surface treatment of high-nickel/iron alloy steel plate for LNG or LPG tanks. 4,696,724, Cl. 204-27.000.

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Deschler, Ulrich; Kleinschmit, Peter; and Michel, Rudolf, 4,697,009, Cl. 540-487.000.
Fischer, Robert; and de Ahna, Dieter, 4,696,700, Cl. 106-291.000.
Russe, Meinhard W.; Bolze, Rudolf; and Koch, Friedhelm, 4,696,914, Cl. 514-19.000.

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Boerma, Hiepke; de Jongh, Rudolph O.; and Van Dijk, Cornelis, 4,696,911, Cl. 502-159.000.

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Ellis, Frank B., Jr.; and Delahoy, Alan E., 4,696,702, Cl. 437-88.000.

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Furuholt, Edgar; and Liaaen, Anders M., 4,696,453, Cl. 251-149.600.

DenHerder, Marvin J. Oil fuel combustion. 4,696,638, Cl. 431-4.000.

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Nabeta, Takeshi; and Hanahara, Isamu, 4,696,956, Cl. 523-137.000.

Dennison Manufacturing Company: *See*—
Anderson, Gary, 4,696,300, Cl. 128-334.00R.

Desai, Praful C., to Smith International. Dual string packer mill. 4,696,502, Cl. 294-86.170.

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Barbier, Gerard Y. G.; Leboure, Gerald J. P. B.; Desaulty, Michel A. A.; Martinez, Rodolphe; and Perigne, Jerome, 4,696,157, Cl. 60-39.230.

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Ferris, David A.; and DeSimone, Daniel J., 4,697,103, Cl. 307-456.000.

DesMarteau, Darryl D., to Research Corporation. N-fluoro-N-perfluoromethyl sulfonamides. 4,697,011, Cl. 540-544.000.

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Sicard, Claude; Kroczynski, Patrice; Gallard, Herve; Mars, Denis; and Devos, Michel, 4,697,239, Cl. 364-468.000.

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Segal, Henry P.; and DeWilde, Carl A., 4,697,262, Cl. 370-84.000.

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Harada, Kaoru; Shimoyama, Akira; and Mizumoto, Hiroji, 4,696,981, Cl. 525-328.200.

Dickerson, John W. Die set apparatus for badges. 4,696,086, Cl. 29-243.520.

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Hauel, Norbert; Austel, Volkhard; Heider, Joachim; Reiffen, Manfred; and Diederen, Willi, 4,696,931, Cl. 514-261.000.

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Nagao, Teruyuki; Kawamura, Yuji; and Kashima, Koichi, 4,696,340, Cl. 165-58.000.

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Nonaka, Yuzo, 4,696,712, Cl. 156-351.000.

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Baker, Robert C.; and Dishner, Bryan W., 4,697,090, Cl. 290-4.00R.

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Welch, Bennie R.; Rasmussen, Russell G.; and Disko, Harry, 4,696,654, Cl. 446-268.000.

Dixon, John A. Vertical blinds chain. 4,696,336, Cl. 160-178.00R.

Dobbs, Nathan F. Container for capturing insects. 4,696,127, Cl. 43-121.000.

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Sampson, Mark E.; and Rosen, Marvin E., 4,696,244, Cl. 112-262.100.

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Dodrill, Gregg W. Speaker and baffle system for a vehicle storage well and method of installing same. 4,696,369, Cl. 181-141.000.

Doering, Robert R.; and Armstrong, Gregory J., to Texas Instruments Incorporated. Method of making field-plate isolated CMOS devices. 4,696,092, Cl. 437-5.000.

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Tanaka, Atsuo; and Dohnomoto, Tadashi, 4,696,866, Cl. 428-614.000.

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Billiet, Colin T.; Baggett, David; and Fielding, Robert M., 4,696,687, Cl. 55-316.000.

Donald, Jay, to Exxon Research and Engineering Company. Flocculation of particles by polymers that precipitate out of solution. 4,696,750, Cl. 210-727.000.

Donaldson, Richard E.; and Hoops, John F., to Merrell Dow Pharmaceuticals Inc. Medroxalol intermediates. 4,697,024, Cl. 549-444.000.

Donn Incorporated: *See*—
Mieyal, David F.; and Koski, Gerald L., 4,696,142, Cl. 52-762.000.

Doriath, Gerard; Hartemann, Pierre; and Jacobelli, Alain, to Thomson-CSF. Measuring system and measuring cell for making magnetic field measurements. 4,697,145, Cl. 324-244.000.

Dostoomian, Ashod S.: *See*—
Vanzetti, Riccardo; and Dostoomian, Ashod S., 4,696,101, Cl. 29-740.000.
Vanzetti, Riccardo; and Dostoomian, Ashod S., 4,696,104, Cl. 29-840.000.

Doubt, Ruxton C. Custom moldable hand grip. 4,696,842, Cl. 428-40.000.

Douglas, James A.: *See*—
McGrath, Ann M.; and Douglas, James A., 4,696,471, Cl. 273-29.00A.

Doumani, Robert S.: *See*—
Estkowski, Michael H.; Doumani, Robert S.; and Estkowski, Christopher G., 4,696,394, Cl. 206-303.000.

Doute, Pascal: *See*—
de Guelis, Hubert V.; and Doute, Pascal, 4,696,496, Cl. 285-137.100.

Dover Corporation: *See*—
Casey, Robert, 4,696,484, Cl. 280-43.160.

Dow Chemical Company, The: *See*—
Bedell, Stephen A., 4,696,802, Cl. 423-226.000.
Ellerbe, Gilbert B., III; and Parrish, Donald B., 4,696,976, Cl. 525-126.000.
Mobley, Larry W.; and Kelley, Don H., 4,696,849, Cl. 428-95.000.
Neil, Lawrence E., 4,696,982, Cl. 525-507.000.
Pritchard, James R.; and Regelman, Dale F., 4,696,954, Cl. 521-167.000.
Snipes, Carl E.; and Coleman, John S., 4,696,817, Cl. 424-123.000.
Stevens, Timothy S.; and Small, Hamish, 4,696,904, Cl. 436-39.000.

Dow Corning Corporation: *See*—
Lee, Chi-long; and Lutz, Michael A., 4,697,026, Cl. 556-418.000.
Varaprath, Sudarsanan, 4,696,834, Cl. 437-223.000.

Drage, David J., to Tegal Corporation. Dual wavelength sensor which employs object as part of a corner reflector. 4,697,089, Cl. 250-561.000.

Drake, Timothy E.: *See*—
Beehler, David E.; Drake, Timothy E.; and Hawk, Timothy E., 4,696,357, Cl. 177-145.000.

Dreher, Hermann: *See*—
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.

Dresner, Joseph, to RCA Corporation. Transistor having a superlattice. 4,697,197, Cl. 357-4.000.

Dresser Industries, Inc.: *See*—
Eifling, Dennis R., 4,696,751, Cl. 210-780.000.

Drew, John H.: *See*—
Winter, Walter W.; Gothard, Steven E.; and Drew, John H., 4,697,282, Cl. 379-67.000.

Drouet, Claudette: *See*—
Minjolle, Louis; Drouet, Claudette; Hordonneau, Alain; and Capdepuy, Bernard, 4,696,710, Cl. 156-89.000.

DSM Rim Nylon V.O.F.: *See*—
Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., 4,696,977, Cl. 525-184.000.

Dsung Precision Company: *See*—
Suh, Kyung S., 4,697,171, Cl. 340-543.000.

Dubach, Werner F., to Alfatechnic AG. Plastic closure with safety band. 4,696,408, Cl. 215-237.000.

Dube, Brian J. Juggling club. 4,696,468, Cl. 272-124.000.

Ducan Steel Benders Ltd.: *See*—
Crosthwaite, Robert P., 4,696,069, Cl. 5-37.00R.

Dulaney, Clarence L.: *See*—
Lysandrou, Michael C.; and Dulaney, Clarence L., 4,696,752, Cl. 252-8.553.

Dulux Australia Ltd.: *See*—
Adeney, Hilary E.; and Hall, Derrard M., 4,696,957, Cl. 523-406.000.

Dunajcsik, Peter: *See*—
Szody, Peter; Dunajcsik, Peter; Villanyi, Miklos; Bossanszky, Ferenc; Libor, Endre; and Kiss, Ferenc, 4,696,643, Cl. 432-120.000.

Du Pont de Nemours, E. I., and Company: *See*—
Bryan, Paul J., 4,696,231, Cl. 102-202.500.
Tebbe, Frederick N., 4,696,968, Cl. 524-610.000.
Verhoeven, Laurentius M.; and van Nes, Cornelis G. J., 4,696,529, Cl. 439-267.000.

Durchenwald, Larry D., to Deere & Company. Workpiece rollover apparatus. 4,696,387, Cl. 198-394.000.

Durr, Dieter, to Linde AG. Method of deburring or deflashing articles. 4,696,421, Cl. 225-1.000.

Durr, Frederick E.: *See*—
Murdock, Keith C.; Damiani, Martin R.; and Durr, Frederick E., 4,696,935, Cl. 514-297.000.

Durrant, Richard C. E.: *See*—
Adams, Graham L.; and Durrant, Richard C. E., 4,696,540, Cl. 350-96.210.

Dursch, Walter; Herwig, Walter; and Engelhardt, Friedrich, to Hoechst Aktiengesellschaft. Process for the preparation of polymers of vinylphosphonic acid in protic solvents. 4,696,987, Cl. 526-216.000.

Duval, Leonard A. Method and apparatus for the drying of solid materials by displacement. 4,696,114, Cl. 34-9.000.

Dybus, Herbert: *See*—
Wolowski, Eckard; Mirtsch, Frank; and Dybus, Herbert, 4,696,735, Cl. 208-408.000.

Dynamit Nobel AG: *See*—
Hargarten, Werner; and Kautz, Rudolf, 4,696,709, Cl. 156-79.000.

Dynatech/U-Z, Inc.: *See*—
Hoffman, Jerzy, 4,697,056, Cl. 200-153.00S.

Dyneer Corporation: *See*—
Thomey, Henry W.; and Heuninck, John B., 4,696,663, Cl. 474-133.000.

E.G.O. Elektro Gerate Blanc u. Fischer: *See*—
Schreder, Felix, 4,697,068, Cl. 219-449.000.

Easley, James C.: *See*—
Higgins, Daniel E.; and Easley, James C., 4,696,298, Cl. 128-305.000.

Eastman, George Y., to Thermacore, Inc. Heat pipe. 4,697,205, Cl. 357-82.000.

Eastman Kodak Company: *See*—
Ettischer, Helmut; Ebner, Arno; Munz, Rolf; and Pollak, Raimund, 4,696,615, Cl. 414-114.000.
Noonan, John M.; and Caccamo, Anthony F., 4,696,990, Cl. 526-304.000.

Eastwood, Barry J., to AEPLC. Aluminum based bearing alloys. 4,696,867, Cl. 428-650.000.

Eaton Corporation: *See*—
Giere, David W., 4,696,164, Cl. 60-485.000.

Ebara Corporation: *See*—
Miyagawa, Teiji; Iwamura, Yoshio; and Hayakawa, Masao, 4,696,452, Cl. 251-25.000.

Ebner, Arno: *See*—
Ettischer, Helmut; Ebner, Arno; Munz, Rolf; and Pollak, Raimund, 4,696,615, Cl. 414-114.000.

Echte, Adolf: *See*—
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.

Egami, Hidemi: *See*—
Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, 4,697,196, Cl. 346-159.000.

Egashira, Yoshinori: *See*—
Tomita, Seisuke; and Egashira, Yoshinori, 4,696,475, Cl. 273-227.000.

Egyt Gyogyszervegyeszeti Gyar: *See*—
Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Palios, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.
Toth, Miklos; Endresz, Valeria; Beladi, Ilona; and Toth, Sandor, 4,696,899, Cl. 435-68.000.

Eidenschink, Rudolf: *See*—
Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, 4,696,549, Cl. 350-350.00R.

Eifling, Dennis R., to Dresser Industries, Inc. Vibratory screening apparatus and method for removing suspended solids from liquid. 4,696,751, Cl. 210-780.000.

Eilertsen, John L. Incrementally indexing linear actuator. 4,697,164, Cl. 335-253.000.

Eimerl, David, to United States of America, Energy. Deuterated L-arginine phosphate monohydrate. 4,697,100, Cl. 307-427.000.

Eino, Teruo, to Olympus Optical Co., Ltd. Color image pickup device with complementary color type mosaic filter and gamma compensation means. 4,697,208, Cl. 358-44.000.

Ekholm, Pertti: *See*—
Savonlahti, Jukka; Ekholm, Pertti; and Harjunmaa, Hannu, 4,696,195, Cl. 73-864.840.

Elder, Michael G. Hamstring muscle exerciser. 4,696,469, Cl. 272-134.000.

Electricite de France: *See*—
Pichot, Jacky; and Oddou, Jacques, 4,696,427, Cl. 236-1.00E.

Electro Adapter: *See*—
Wolcott, Wayne B., 4,696,327, Cl. 140-150.000.

Electro-Biology, Inc.: *See*—
Gardner, Arthur M. N.; and Fox, Roger H., 4,696,289, Cl. 128-64.000.

Electro Cell AB: *See*—
Gustafsson, Hans; Schwartz, Stephan; and Widen, Karl-Bertil, 4,696,910, Cl. 502-159.000.

Electrochemische Energieconversie N.V. (Elenco N.V.): *See*—
Blanchart, Alain P. O.; and Van Der Poorten, Christian J. E. C., 4,696,872, Cl. 429-42.000.

Electromagnetic Sciences, Inc.: *See*—
Hoover, John C.; and Giese, David E., 4,697,158, Cl. 333-1.100.

Elenteny, Barbara. Peel away multi-layer gloves. 4,696,065, Cl. 2-168.000.

Elkem a/s: *See*—
Aune, Jan A. J.; and Evensen, Knut K., 4,696,457, Cl. 266-207.000.

Ellames, George J.; and Jaxa-Chamiec, Albert A., to G. D. Searle & Co. Substituted dihydroimidazo[1,2-a]quinoxalines. 4,696,928, Cl. 514-250.000.

Ellerbe, Gilbert B., III; and Parrish, Donald B., to Dow Chemical Company, The. Vinyl urethane composite polymer containing dispersed soft copolymer particles. 4,696,976, Cl. 525-126.000.

Ellion, Dolores D.; and Ellion, Max E. Gun powder dispensing and measuring apparatus. 4,696,356, Cl. 177-123.000.

Ellion, Max E.: *See*—
Ellion, Dolores D.; and Ellion, Max E., 4,696,356, Cl. 177-123.000.

Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., to National Research Development Corporation. Pesticidal cyclopropane carboxylic acid esters, their compositions and use. 4,696,944, Cl. 514-531.000.

Ellis, Frank B., Jr.; and Delahoy, Alan E., to Chronar Corp. Method of depositing wide bandgap amorphous semiconductor materials. 4,696,702, Cl. 437-88.000.

Ellwood, Derek C.; Evans, Charles G. T.; and Yeo, Richard G., to Secretary of State for Defence in Her Majesty's Government of the United Kingdon of Great Britain and Northern Ireland, The. Production of bacterial polysaccharides. 4,696,900, Cl. 435-104.000.

Elmec Corporation: *See*—
Kameya, Kazuo, 4,697,162, Cl. 333-161.000.

Elmquist, Steven A.; and Boesger, Leonard E., to W. S. Tyler, Incorporated. Drilling mud cleaning system. 4,696,353, Cl. 175-206.000.

Elsohly, Hala N.: *See*—
Bedford, John A.; Elsohly, Hala N.; Wilson, Marvin C.; and Turner, Carlton E., 4,696,819, Cl. 424-195.100.

Elter, Claus; and Schoening, Josef, to Hochtemperatur-Reaktorbau GmbH. Prestressed concrete pressure vessel, in particular for a nuclear reactor installation. 4,696,790, Cl. 376-296.000.

Eltro GmbH: *See*—
Ruger, James; and Welz, Wolfgang, 4,696,567, Cl. 356-28.000.

Emda Fabrik Elektro-Medizinischer und Dentaler Apparate Georg Hartmann GmbH & Co. KG: *See*—
Saupe, Martin; Dauernheim, Hans; and Markl, Maximillian, 4,696,645, Cl. 433-125.000.

Enami, Katsuya; Tsuyuguchi, Hiroshi; and Sakaguchi, Takahiro, to Teac Corporation. Stepping motor drive system and method capable of stopping the rotor in a required angular position. 4,697,129, Cl. 318-696.000.

Enda, Ryuichi, to Yamaha. Motorcycle frame. 4,696,363, Cl. 180-219.000.

Endo, Isao: *See*—
Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.

Endo, Masayuki: *See*—
Sasaki, Toshihiko; Sunayama, Yooji; Yoshida, Isao; and Endo, Masayuki, 4,696,800, Cl. 422-186.180.

Endo, Mitsuharu: *See*—
Okuno, Shigeru; Torisawa, Yoshihiro; Endo, Mitsuharu; Nakayama, Tetsuroh; Shimosato, Masashi; and Fukushima, Takafumi, 4,696,589, Cl. 400-119.000.

Endresz, Valeria: *See*—
Toth, Miklos; Endresz, Valeria; Beladi, Ilona; and Toth, Sandor, 4,696,899, Cl. 435-68.000.

Energy Conversion Devices, Inc.: *See*—
Ovshinsky, Stanford R.; Guha, Subhendu; Nath, Prem; Yang, Chi Chung; Fournier, Jeffrey; and Kulman, James, 4,696,758, Cl. 252-188.310.
Vijan, Meera, 4,696,885, Cl. 430-311.000.

Engelhardt, Friedrich: *See*—
Dursch, Walter; Herwig, Walter; and Engelhardt, Friedrich, 4,696,987, Cl. 526-216.000.

Engelhardt, Hubert: *See*—
Habermann, Wolfgang; Hammes, Peter; Engelhardt, Hubert; Geiger, Wolfgang; Haltrich, Walter; and Simmler, Werner, 4,696,749, Cl. 210-721.000.

Enichem Elastomeri, S.p.A.: *See*—
Carbonaro, Antonio; and Ferraro, Domenico, 4,696,984, Cl. 526-98.000.

Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, to Voest-Alpine Aktiengesellschaft. Electric melting furnace arrangement as well as a method of influencing the composition of a mineral melt for producing wool. 4,697,274, Cl. 373-79.000.

Enoki, Shigenaga; Yoshio, Kazuya; and Yamaguchi, Nobuo, to Honda Giken Kogyo Kabushiki Kaisha. Power-unit support structure of motorcycle. 4,696,364, Cl. 180-228.000.

Enomoto, Masao, to Ichikoh Industries Limited. Electric remote control mirror apparatus. 4,696,555, Cl. 350-634.000.

Enviro-Spray Systems Incorporated: *See*—
Schmidt, Richard; and Pizzo, Joseph A., 4,696,145, Cl. 53-436.000.

Environmental Diagnostics, Inc.: *See*—
Kelton, Arden A., 4,696,797, Cl. 422-101.000.

Eplett, Gene W. Multi-stepped gameboard apparatus. 4,696,476, Cl. 273-241.000.

Epperson, David L., to John Fluke Mfg. Co., Inc. Particulate spacers for inhibiting Newton rings in touch sensitive overlays. 4,696,860, Cl. 428-325.000.

Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, to Omni-Flow, Inc. Infusion system having plural fluid input ports and at least one patient output port. 4,696,671, Cl. 604-67.000.

Equus Inc.: *See*—
Chung, Szu-Chi, 4,697,220, Cl. 361-100.000.

Esch, Friedrich D.; and Price, John G., to AMF Incorporated. Packaging machines. 4,696,146, Cl. 53-529.000.

Establissements les Fils d'Auguste Chomarat & Cie: *See*—
Fourezon, Andre , 4,696,853, Cl. 428-257.000.

Estkowski, Christopher G.: *See*—
Estkowski, Michael H.; Doumani, Robert S.; and Estkowski, Christopher G., 4,696,394, Cl. 206-303.000.

Estkowski, Michael H.; Doumani, Robert S.; and Estkowski, Christopher G., to Shepherd Products U.S., Inc. Easily removable protective covering for annular objects. 4,696,394, Cl. 206-303.000.

ETA S.A. Fabriques d'Ebauches: *See*—
Muller, Jacques; and Triponez, Andre , 4,696,577, Cl. 368-276.000.

Etablissements Farnier & Penin: *See*—
Laville, Bernard; and Prouteau, Philippe, 4,696,511, Cl. 296-216.000.

Ethier, Dolores O., to Lectec Corporation. Bilayer substrate. 4,696,854, Cl. 428-287.000.

Ettischer, Helmut; Ebner, Arno; Munz, Rolf; and Pollak, Raimund, to Eastman Kodak Company. Copying machine. 4,696,615, Cl. 414-114.000.

Evans, Charles G. T.: *See*—
Ellwood, Derek C.; Evans, Charles G. T.; and Yeo, Richard G., 4,696,900, Cl. 435-104.000.

Evans, Robert T.: *See*—
Scott, Theron A.; and Evans, Robert T., 4,696,344, Cl. 166-182.000.

Evely, William W., to Ball Corporation. Thermoplastic container forming apparatus. 4,696,636, Cl. 425-526.000.

Evensen, Knut K.: *See*—
Aune, Jan A. J.; and Evensen, Knut K., 4,696,457, Cl. 266-207.000.

Everett, Charles J.: *See*—
Ochsner, Rolf H.; and Everett, Charles J., 4,697,054, Cl. 200-82.00R.

Excello Specialty Company, The: *See*—
Jones, Wallace R.; and Isaksen, Robert A., 4,696,848, Cl. 428-80.000.

Extance, Philip; and Jones, Roger E., to STC, plc. Spherical shell fibre optic magnetic field sensors and magnetometers and magnetic gradient detectors incorporating them. 4,697,146, Cl. 324-244.000.

Extance, Philip: *See*—
Pitt, Gilles D.; Extance, Philip; and Jones, Roger E., 4,696,543, Cl. 350-96.230.

Exxon Printing Systems, Inc.: *See*—
Howkins, Stuart D., 4,697,193, Cl. 346-1.100.

Exxon Production Research Company: *See*—
Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., 4,696,603, Cl. 405-227.000.
Davenport, George F., 4,696,601, Cl. 405-202.000.
Finn, Lyle D.; and Steele, Kenneth M., 4,696,604, Cl. 405-227.000.

Exxon Research and Engineering Company: *See*—
Donald, Jay, 4,696,750, Cl. 210-727.000.

F. J. Littell Machine Company: *See*—
Boytor, Samuel G.; and Jurs, Jeffry W., 4,697,231, Cl. 364-188.000.

Fabbri, Fabrizio, to COMER S.p.A. Angle drive transmission unit particularly for agricultural machinery. 4,696,199, Cl. 74-417.000.

Fairchild, Jeffery; Heitz, Steven A.; and Symington, John, to Sundstrand Corporation. High temperature seal and turbine mount. 4,696,618, Cl. 415-119.000.

Fanuc Ltd.: *See*—
Amemiya, Yoichi; Sogabe, Masatoyo; and Tagami, Kiyoshi, 4,697,114, Cl. 310-156.000.
Kishi, Hajimu; Seki, Masaki; and Tanaka, Kunio, 4,697,249, Cl. 364-900.000.

Fanuc Ltd: *See*—
Inaba, Yoshiharu, 4,696,632, Cl. 425-150.000.

Farco-Pharma GmbH: *See*—
Pleines, Peter; and Wolf, Erich, 4,696,297, Cl. 128-303.100.

Farel, Alain; Agobian, Manuel; and Le, Sinh, to Farel, Alain. Device for digitalizing graphical data. 4,697,050, Cl. 178-18.000.

Farley, James R.: *See*—
Grunert, Kurt A.; and Farley, James R., 4,697,163, Cl. 335-174.000.

Farmos Group Ltd.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sunduiqst, Hannu K., 4,696,949, Cl. 514-648.000.

Farrell, Robert F. Neutral zone, piece-capture game. 4,696,478, Cl. 273-261.000.

Farrow, Robert T. Anti-theft device for road vehicles. 4,696,172, Cl. 70-238.000.

Fatovic, Peter: *See*—
Lafrance, Conrad D.; and Fatovic, Peter, 4,697,283, Cl. 379-443.000.

Fawzi, Mahdi B.: *See*—
Silbering, Steven B.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,696,812, Cl. 424-445.000.

Fekkes, Wilhelmus F.: *See*—
Geerings, Michael P. W.; Christis, Wilhelmus J.; Fekkes, Wilhelmus F.; and Schmitz, Herman J. R., 4,697,046, Cl. 178-1.000.

Feldman, Paul H., to Hazeltine Corporation. Testing of RF diode phase shifters. 4,697,141, Cl. 324-158.00R.

Felten, Klaus; Honroth, Walter; Kuhn, Siegfried; Schulten, Hermann; and Zeller, Bruno, to Oerlikon-Boehringer GmbH. Lathe having an integrated chuck. 4,696,209, Cl. 82-40.00R.

Fenner, Edwin H. Portable platform assembly for dancers and the like. 4,696,470, Cl. 272-144.000.

Fenner, Hans: *See*—
Hortmann, Guenther; Kunick, Klaus; and Fenner, Hans, 4,696,287, Cl. 128-1.00R.

Ferraro, Domenico: *See—*
Carbonaro, Antonio; and Ferraro, Domenico, 4,696,984, Cl. 526-98.000.

Ferris, David A.; and DeSimone, Daniel J., to Quadic Systems, Inc. Low power high current sinking TTL circuit. 4,697,103, Cl. 307-456.000.

Feth, Max: *See—*
Lenk, Erich; and Feth, Max, 4,696,633, Cl. 425-192.00S.

FEV Forschungsgesellschaft fur Energietechnik und Verbrennungsmotoren mbH: *See—*
Pischinger, Franz, 4,696,270, Cl. 123-274.000.

Fewox, Cary M., to C&M Custom and Portable Kennels, Inc. Enclosure and housing facility for an animal. 4,696,259, Cl. 119-19.000.

Fiat Auto S.p.A.: *See—*
Palazzetti, Mario, 4,697,094, Cl. 307-40.000.

Fielding, Robert M.: *See—*
Billiet, Colin T.; Baggett, David; and Fielding, Robert M., 4,696,687, Cl. 55-316.000.

Fields, Thomas L.: *See—*
Child, Ralph G.; Fields, Thomas L.; Wilkinson, Raymond G.; and Lin, Yang-I, 4,696,936, Cl. 514-297.000.

Fields, Tom R. Portable step and carrying device for stud walls. 4,696,372, Cl. 182-92.000.

Figore, Timothy: *See—*
Ward, Thomas A.; Petracca, Victor G.; and Figore, Timothy, 4,696,864, Cl. 428-413.000.

Figueroa, Luis: *See—*
Slayman, Charles W.; and Figueroa, Luis, 4,696,648, Cl. 437-5.000.

Finetex, Inc.: *See—*
Novakovic, Mario; and Abend, Phillip G., 4,696,767, Cl. 252-557.000.

Finic, B.V.: *See—*
Ressi di Cervia, Arturo L., 4,696,607, Cl. 405-267.000.

Finley, Rufus E., to Unisys Corp. Asynchronous checkpointing system for error recovery. 4,697,266, Cl. 371-12.000.

Finn, Lyle D.; and Steele, Kenneth M., to Exxon Production Research Company. Pile assembly for an offshore structure. 4,696,604, Cl. 405-227.000.

Finn, Lyle D.: *See—*
Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., 4,696,603, Cl. 405-227.000.

Firestone Tire & Rubber Company, The: *See—*
Koch, Russell W., 4,696,332, Cl. 152-367.000.

Fischer, Hermann: *See—*
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.

Fischer, Robert; and de Ahna, Dieter, to Degussa Aktiengesellschaft. Inorganic pigments and process for their production. 4,696,700, Cl. 106-291.000.

Fitts, Renee A.; Hsiung, Nancy; and Hamer, Dean H., to Integrated Genetics, Inc. Vector encoding hepatitis B surface antigen. 4,696,898, Cl. 435-68.000.

Fitzsimmons, James R.: *See—*
Cheal, James; Fitzsimmons, James R.; and Foley, Edward J., 4,697,184, Cl. 342-28.000.

Flachglas Aktiengesellschaft: *See—*
Bartelsen, Lutz, 4,697,082, Cl. 250-341.000.

Flaig, Ulrich; and Sieber, Albrecht, to Robert Bosch GmbH. Method for influencing the metering of fuel to an internal combustion engine. 4,696,276, Cl. 123-478.000.

Fleischer, Donald W., to Veeder Industries Inc. Electronic hub odometer. 4,697,278, Cl. 377-24.000.

Fletcher Sutcliffe Wild Ltd.: *See—*
Pentith, Gerald R. O., 4,696,391, Cl. 198-833.000.

Floyd, Don E., to Henkel Corporation. Aminopolyols and polyurethanes prepared therefrom. 4,696,771, Cl. 260-404.000.

Fogarty, Thomas J.: *See—*
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Albulescu, Marilena; and McMahon, Joseph F., 4,696,679, Cl. 48-203.000.

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Seli, Michel, 4,696,788, Cl. 376-253.000.

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Beggs, Richard D.; Friesen, Harold W.; and Nutt, Wendell G., 4,697,051, Cl. 178-63.00D.

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Cipar, Martin S., 4,696,674, Cl. 800-1.000.

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Harada, Mitsuyoshi, 4,696,266, Cl. 123-182.000.

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Deguchi, Naoyasu; Kojima, Tstsuro; Ohno, Shigeru; Nakamura, Koki; and Miyazaki, Hideo, 4,696,894, Cl. 430-551.000.
Kato, Mikihiko; Komine, Shigeo; Morita, Kazuhiko; and Okuzawa, Yasutoshi, 4,696,846, Cl. 428-65.000.
Miyoshi, Takahito; Aoki, Nobuo; Yoneyama, Takashi; Kasuga, Akira; Okutu, Toshimitu; Fujiyama, Masaaki; and Okuzawa, Yasutoshi, 4,696,859, Cl. 428-323.000.
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Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,696,858, Cl. 428-323.000.
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Umemoto, Makoto; Nakamura, Kotaro; and Furutachi, Nobuo, 4,696,893, Cl. 430-543.000.

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Toyota, Makoto; Takeshita, Fumitaka; and Arakawa, Satoshi, 4,697,210, Cl. 358-98.000.

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Kitano, Hirohito; Oowaki, Toshiki; and Baba, Takashi, 4,696,697, Cl. 106-3.000.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Yamashita, Tatsuo; Terada, Masafumi; and Suzuki, Koji, 4,696,895, Cl. 435-7.000.

Fujishiro, Takeshi; Takahashi, Sadahiro; and Kaneko, Takanobu, to Nissan Motor Company, Limited. Automotive suspension system with variable damping characteristics. 4,696,489, Cl. 280-707.000.

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Hata, Yujiro, 4,697,215, Cl. 360-95.000.
Kousaka, Kunimitsu; and Gotoh, Kunihiko, 4,697,154, Cl. 330-277.000.
Motegi, Masanori, 4,697,235, Cl. 364-200.000.
Nozue, Yoshihiro, 4,697,265, Cl. 371-5.000.
Okajima, Yoshinori, 4,697,104, Cl. 307-463.000.
Saito, Tadahiro; and Gotoh, Kunihiko, 4,697,140, Cl. 324-73.00R.
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Fujiyama, Masaaki: *See—*
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Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,696,483, Cl. 280-6.00H.

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Furuyama, Tohru; and Uchida, Yukimasa, to Tokyo Shibaura Denki Kabushiki Kaisha. Dynamic type semiconductor memory device. 4,697,252, Cl. 365-189.000.

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Kawai, Keiichi; Yasuda, Setsuo; and Sakaime, Zenichiro, 4,696,079, Cl. 17-33.000.

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Ellames, George J.; and Jaxa-Chamiec, Albert A., 4,696,928, Cl. 514-250.000.

GA Technologies Inc.: *See—*
Bourque, Robert F., 4,696,781, Cl. 376-136.000.

Gabbert, James D.: *See—*
Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., 4,696,977, Cl. 525-184.000.

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Burkum, Merlin E.; and Gabriel, Charles M., 4,697,134, Cl. 320-48.000.

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Sicard, Claude; Kroczynski, Patrice; Gallard, Herve; Mars, Denis; and Devos, Michel, 4,697,239, Cl. 364-468.000.

Gallivan, Timothy J.: *See—*
Larson, Richard I.; Ringle, Richard P.; Connolly, John D., Jr.; and Gallivan, Timothy J., 4,696,769, Cl. 252-638.000.

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Garsee, Henry A.: *See—*
Butts, Gene A.; Kelley, Charles D.; Garsee, Henry A.; Petty, Bruce R.; and Pauley, James L., 4,697,236, Cl. 364-416.000.

Gat, Nahum, to TRW Inc. Pressure pump and injector valve system for liquid-propellant engines. 4,696,160, Cl. 60-258.000.

Gausepohl, Hermann: *See—*
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.

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Geary, Joseph M.; and Peterson, Phillip R., to United States of America, Air Force. Method of measuring spherical aberration and apparatus therefor. 4,696,569, Cl. 356-124.000.

Gebr. Happich GmbH: *See—*
Zwirner, Gerhard, 4,696,510, Cl. 296-97.00K.

Geeck, Joseph S., III. Power mower with blade-brake clutch. 4,696,150, Cl. 56-11.300.

Geerings, Michael P. W.; Christis, Wilhelmus J.; Fekkes, Wilhelmus F.; and Schmitz, Herman J. R., to U.S. Philips Corporation. Teletext signal processing circuit for a teletext receiver. 4,697,046, Cl. 178-1.000.

Geerts, Jean-Pierre: *See—*
Gobert, Jean; Giurgea, Corneliu; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,942, Cl. 514-424.000.
Gobert, Jean; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,943, Cl. 514-424.000.

Gehring, Johann: *See—*
Birkle, Siegfried; and Gehring, Johann, 4,696,728, Cl. 204-213.000.

Geiger, Rolf; Gerhards, Hermann; and Kruse, Hansjorg, to Hoechst Aktiengesellschaft. Novel peptides which are active on the central nervous system and have an action on the cholinergic system. 4,696,913, Cl. 514-15.000.

Geiger, Wolfgang: *See—*
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Gemert, Barry V., to PPG Industries, Inc. Sulfamoyl urea derivatives. 4,696,695, Cl. 71-92.000.

General Coatings: *See—*
Sonck, Willy, 4,696,597, Cl. 405-12.000.

General Electric Company: *See—*
Brunelle, Daniel J.; Guggenheim, Thomas L.; Boden, Eugene P.; Shannon, Thomas G.; and Guiles, Joseph W., 4,696,998, Cl. 528-272.000.
Harnden, John D., Jr.; Kornrumpf, William P.; Kohl, James E.; and Adler, Michael S., 4,697,118, Cl. 310-331.000.
Hobson, Robert R., 4,696,792, Cl. 376-377.000.
Janatpour, Mojtaba; and Shafer, Sheldon J., 4,697,034, Cl. 558-274.000.
Jarvinen, W. Bruce; and Lukas, Stephen J., 4,697,126, Cl. 318-331.000.
Larson, Richard I.; Ringle, Richard P.; Connolly, John D., Jr.; and Gallivan, Timothy J., 4,696,769, Cl. 252-638.000.
Penney, Carl M., 4,696,574, Cl. 356-375.000.
Peters, Edward N., 4,696,995, Cl. 528-206.000.
Roos, Hartog J.; and Schilling, Edward F., 4,697,075, Cl. 250-213.0VT.
Rosenquist, Niles R., 4,696,997, Cl. 528-271.000.
Thimineur, Raymond J.; and Raleigh, William J., 4,696,969, Cl. 524-762.000.
Towlson, Howard E., 4,696,722, Cl. 204-6.000.

General Foods Corporation: *See—*
Leusner, Steven J.; Rapiael, Barbara C.; and Swanhart, William G., Jr., 4,696,826, Cl. 426-565.000.
Meczkowski, Frank J.; and Triani, Ronald J., 4,696,824, Cl. 426-102.000.

Genereaux, Eugene P.; Jameson, Samuel M.; and Brooks, Timothy K. Clamping apparatus. 4,696,460, Cl. 269-6.000.

Gentry, Cecil C., to Phillips Petroleum Company. Method for gas treatment of a bed of particles. 4,696,734, Cl. 208-407.000.

George Koch Sons, Inc.: *See*—
Spindler, Irvin, 4,696,254, Cl. 118-610.000.

Georgia Tech Research Corporation: *See*—
Legg, Keith O., 4,696,829, Cl. 427-38.000.

Gerhards, Hermann: *See*—
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Geri Engineering GmbH: *See*—
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Walter, Jean-Jacques; Petit, Daniel; Marzocca, Joseph; Amalric, Jean; and Bernard, Georges, 4,697,055, Cl. 200-148.00B.

Germond, Jean-Claude; and Clement, Gilles, to Commissariat a l'Energie Atomique. Tool holder robot for intervening in an enclosure having an access opening. 4,696,612, Cl. 414-8.000.

Germundson, Lars, to L G Innovations AB. Electric heating element. 4,697,063, Cl. 219-213.000.

Ghate, Madhav R.; and Yang, Ralph T., to United States of America, Energy. Method and apparatus for the selective separation of gaseous coal gasification products by pressure swing adsorption. 4,696,680, Cl. 55-25.000.

Ghosh, Sambhunath; Chynoweth, David P.; and Tarman, Paul B., to Institute of Gas Technology. Two phase anaerobic digestion. 4,696,746, Cl. 210-603.000.

Giere, David W., to Eaton Corporation. Hydrostatic transaxle and locking differential and brake therefor. 4,696,164, Cl. 60-485.000.

Gierenz, Gerhard: *See*—
Dierichs, Wolfgang; Gierenz, Gerhard; and Kraus, Gabriella, 4,696,836, Cl. 427-208.400.

Giese, David E.: *See*—
Hoover, John C.; and Giese, David E., 4,697,158, Cl. 333-1.100.

Giesselmann, Jurgen: *See*—
Ruetz, Georg; and Giesselmann, Jurgen, 4,696,620, Cl. 415-164.000.

Gillen, Gerard J., Jr. Composite reinforced concrete and timber pile section and method of installation. 4,696,605, Cl. 405-251.000.

Gilman, David J.: *See*—
Yellin, Tobias O.; and Gilman, David J., 4,696,933, Cl. 514-275.000.

Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, to Zambon S.p.A. Process for the preparation of optically active alpha-arylalkanoic acids and novel intermediates thereof. 4,697,036, Cl. 562-418.000.

Girard, Donald A. Ski which is stiff in torsion and relatively weak in beam. 4,696,487, Cl. 280-602.000.

Gist Brocades N.V.: *See*—
Robertson, Brian W.; and Phillips, Gareth T., 4,696,901, Cl. 435-180.000.

Gittos, Maurice W.; and Hibert, Marcel, to Merrell Dow Pharmaceuticals Inc. 4-(2-pyrimidinyl)-1-piperazinyl heterocyclic carbonyl derivatives. 4,696,927, Cl. 514-236.000.

Giurgea, Corneliu: *See*—
Gobert, Jean; Giurgea, Corneliu; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,942, Cl. 514-424.000.

Givaudan Corporation: *See*—
Naipawer, Richard E., 4,696,766, Cl. 512-8.000.

Gjesdal, Harvey J., to Tektronix, Inc. Method for applying elastomeric support pads to rigid casings. 4,696,089, Cl. 29-451.000.

Glance, Bernard, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Single-photodiode optical heterodyne mixers. 4,697,284, Cl. 455-619.000.

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Hahn, Thomas O., 4,696,613, Cl. 414-11.000.

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Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., 4,696,603, Cl. 405-227.000.

Gleason, Kimberly R.: *See*—
Lockwood, Larry R.; Gleason, Kimberly R.; and Strid, Eric W., 4,697,143, Cl. 324-158.00P.

Glemser, Oskar; Buss, Dieter H.; and Bauer, Jurgen, to Varta Batterie Aktiengesellschaft. Positive electrode for alkaline storage cells. 4,696,875, Cl. 429-206.000.

Glibbery, Albert W., to National Transducer Corporation. Electronic weighing apparatus. 4,696,359, Cl. 177-211.000.

Glomeau, J. Robert, to REXA Corporation. Control valve and hydraulic system employing same. 4,696,163, Cl. 60-476.000.

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Hiraoka, Shigeaki; and Seo, Takamasa, 4,697,071, Cl. 235-379.000.

Glucksman, Dov Z. Electric hair curling waved with improved heating element arrangement. 4,697,066, Cl. 219-225.000.

Gobert, Jean; Giurgea, Corneliu; Geerts, Jean-Pierre; and Bodson, Guy, to UCB Societe Anonyme. Treatment of memory impairment using (R)-alpha-ethyl-2-oxo-1-pyrrolidineacetamide. 4,696,942, Cl. 514-424.000.

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Goel, Anil B., to Ashland Oil, Inc. Thiol carbamates as latent accelerators for curing epoxy resins. 4,696,992, Cl. 528-90.000.

Goetz, Michael A.: *See*—
Houck, David R.; Inamine, Edward S.; and Goetz, Michael A., 4,696,925, Cl. 514-219.000.

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Johnen, Rolf; Kirch, Hans; and Otto, Volkmar, 4,696,657, Cl. 464-93.000.

Goff, Jerry K.; and Chizever, Gary E., to Performance Controls, Inc. Method and apparatus for determining shaft position and for providing commutation signals. 4,697,125, Cl. 318-254.000.

Goldberg, Marvin C.; Cunningham, Kirkwood M.; and Weiner, Eugene R., to United States of America, Interior. Suspended sediment sensor. 4,696,571, Cl. 356-336.000.

Golden Enterprises, Inc.: *See*—
Winter, Walter W.; Gothard, Steven E.; and Drew, John H., 4,697,282, Cl. 379-67.000.

Gonczy, John D.: *See*—
Niemann, Ralph C.; Gonczy, John D.; and Nicol, Thomas H., 4,696,169, Cl. 62-514.00R.

Gonzalez, Wayne H.: *See*—
Lawhon, Robert A.; Heithoff, Robert B.; and Gonzalez, Wayne H., 4,696,691, Cl. 65-27.000.

Goodman, Joseph R.: *See*—
Coller, James R.; and Goodman, Joseph R., 4,696,525, Cl. 439-69.000.

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Neil, Jeffrey T., 4,696,778, Cl. 264-65.000.
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Guzzi, Alberto, to Hoechst Aktiengesellschaft. Process for the production of negative relief copies using photosensitive composition having 1,2-quinone diazide and quaternary ammonium compound. 4,696,891, Cl. 430-325.000.
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Habermann, Wolfgang; Hammes, Peter; Engelhardt, Hubert; Geiger, Wolfgang; Haltrich, Walter; and Simmler, Werner, to BASF Aktiengesellschaft. Oxidative treatment of wastewaters. 4,696,749, Cl. 210-721.000.
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Haines, Ralph W., to National Semiconductor Corporation. Four-state I/O control circuit. 4,697,107, Cl. 307-474.000.
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Haubennestel, Karlheinz; Breil, Daniela; Bubat, Alfred; and Spratte, Werner, to Byk-Chemie GmbH. De-foamer and processes for its production. 4,696,761, Cl. 252-358.000.

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Heiple, Kingsbury G. Tool for use in anchoring implantable prosthesis and method. 4,696,292, Cl. 128-92.00V.

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Martin, Andrea E., 4,696,985, Cl. 526-119.000.
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Thomey, Henry W.; and Heuninck, John B., 4,696,663, Cl. 474-133.000.

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Shoji, Hisashi; Haneda, Satoshi; and Hiratsuka, Seiichiro, 4,696,880, Cl. 430-42.000.

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Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.

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Hitachi Computer Engineering Co., Ltd.: *See*—
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Hitachi, Ltd.: *See*—
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Honma, Noriyuki; Kitsukawa, Goro; and Suzuki, Makoto, 4,697,109, Cl. 307-475.000.
Ishitani, Tohru; Tamura, Hifumi; and Umemura, Kaoru, 4,697,086, Cl. 250-492.200.
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Kato, Yasuo; Ono, Tetsuo; Watanabe, Yoshio; Murayama, Seiichi; Mikoshiba, Shigeo; and Matsuno, Hiromitsu, 4,697,121, Cl. 313-595.000.
Komori, Kazuhiro; Kuroda, Kenichi; and Okuyama, Kousuke, 4,697,198, Cl. 357-23.300.
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Matsushita, Osami; Takagi, Michiyuki; Yoneyama, Mitsuho; and Sugaya, Toyomi, 4,697,128, Cl. 318-607.000.
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Sakaguchi, Isao; and Kawaide, Tatsuo, 4,696,831, Cl. 427-48.000.
Shiibayashi, Masao; and Murayama, Akira, 4,696,629, Cl. 418-55.000.
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Funahashi, Masaya; Miyata, Teruhisa; Inoue, Kenichi; and Miyake, Akira, 4,696,869, Cl. 428-695.000.

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Okabe, Takahiro; Hayashi, Makoto; Morisuye, Katuhiro; Watanabe, Tomoyuki; Washio, Katsuyoshi; Ogura, Setsuo; Furihata, Makoto; and Kondo, Shizuo, 4,697,102, Cl. 307-454.000.

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Hobbs, Oliver K., 4,696,151, Cl. 56-14.600.

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Elter, Claus; and Schoening, Josef, 4,696,790, Cl. 376-296.000.

Hockings, Eric F.: *See*—
Alig, Roger C.; Bloom, Stanley; and Hockings, Eric F., 4,697,120, Cl. 313-412.000.

Hodges, Daryl H. Examining apparatus. 4,696,546, Cl. 350-235.000.

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Kurosu, Yasuhisa; Kawada, Hiroshi; Kanasugi, Haruki; and Hosokawa, Akio, 4,696,947, Cl. 514-478.000.

Hoechst Aktiengesellschaft: *See*—
Buhr, Gerhard, 4,696,888, Cl. 430-270.000.
Dursch, Walter; Herwig, Walter; and Engelhardt, Friedrich, 4,696,987, Cl. 526-216.000.
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Guzzi, Alberto, 4,696,891, Cl. 430-325.000.
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Krug, Ulrich, 4,696,586, Cl. 384-500.000.
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Hoffmann-La Roche Inc.: *See*—
Horecker, Bernard L., 4,696,915, Cl. 514-21.000.
Merkli, Bernhard, 4,696,921, Cl. 514-157.000.
Mullin, John G., Jr.; Nakamura, Keiji; Tilley, Jefferson W.; and Watanabe, Hiroshi, 4,696,930, Cl. 514-256.000.
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Hokoku Chain Co., Ltd.: *See*—
Kanayama, Hitoshi, 4,696,236, Cl. 104-165.000.
Holland, John H.; and Burks, Arthur W. Adaptive computing system capable of learning and discovery. 4,697,242, Cl. 364-513.000.
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Whiteley, John, 4,696,436, Cl. 242-35.50R.
Holt, Nicholas P.: *See*—
Desyllas, Peter L. L.; Holt, Nicholas P.; and Naven, Finbar, 4,697,268, Cl. 371-67.000.
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Homen, Manny. Weighing apparatus and method for use in weighing live fish. 4,696,360, Cl. 177-262.000.
Homer, David A.: *See*—
Doerman, Eryk S.; Turner, William J.; Homer, David A.; Stewart, Andrew D. G.; and Clarke, Ian, 4,696,358, Cl. 177-145.000.
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Aoki, Takashi; Fukuda, Yukihiro; and Nishikawa, Masao, 4,696,383, Cl. 192-70.120.
Otobe, Yutaka; Suzuki, Yoshio; Kimura, Shigehiro; and Ohsawa, Naoki, 4,696,273, Cl. 123-417.000.
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Enoki, Shigenaga; Yoshio, Kazuya; and Yamaguchi, Nobuo, 4,696,364, Cl. 180-228.000.
Hattori, Shigeru, 4,696,366, Cl. 180-296.000.
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Honeywell Inc.: *See*—
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Honig, Richard E.: *See*—
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Yamawaki, Ichiro; Ogawa, Kazuo; Ono, Naohiko; Honna, Takaji; Nagayama, Sekio; and Yasumoto, Mitsugi, 4,696,929, Cl. 514-253.000.
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Chard, Brian C.; Hooper, John D.; and Bale, Christopher R., 4,696,311, Cl. 131-109.100.
Hoops, John F.: *See*—
Donaldson, Richard E.; and Hoops, John F., 4,697,024, Cl. 549-444.000.
Hoover, Gregory A., to Sonoco Products Company. Bottle bag. 4,696,403, Cl. 206-602.000.
Hoover, John C.; and Giese, David E., to Electromagnetic Sciences, Inc. Reduced height waveguide circulator. 4,697,158, Cl. 333-1.100.
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Minjolle, Louis; Drouet, Claudette; Hordonneau, Alain; and Capdepuy, Bernard, 4,696,710, Cl. 156-89.000.
Horecker, Bernard L., to Hoffmann-La Roche Inc. Parathymosin alpha. 4,696,915, Cl. 514-21.000.
Horgan, John J., to United Technologies Corporation. Gas turbine outlet arrangement. 4,696,159, Cl. 60-226.100.
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Horiuchi, Shigenori: *See*—
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HORTMANN GmbH: *See*—
Hortmann, Guenther; Kunick, Klaus; and Fenner, Hans, 4,696,287, Cl. 128-1.00R.
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Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, 4,697,196, Cl. 346-159.000.
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Houle, Edmund C., Jr.: *See*—
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Brooks, Edward, 4,696,378, Cl. 188-170.000.
Howbrook, Ernest, to Verify Electronics Limited. Position sensing apparatus. 4,697,144, Cl. 324-207.000.
Howe, Phillip D.: *See*—
Howe, Steven R.; and Howe, Phillip D., 4,696,119, Cl. 40-301.000.
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Howell, Larry: *See*—
Clark, Leigh B.; Howell, Larry; and Hunter, Richard G., 4,696,302, Cl. 128-401.000.
Howkins, Stuart D., to Exxon Printing Systems, Inc. Method of operating an ink jet having high frequency stable operation. 4,697,193, Cl. 346-1.100.
Howlett, Donald L., to Texaco Inc. Implosion type energy source for seismic exploration. 4,697,255, Cl. 367-146.000.
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Amano, Satoru; Horiuchi, Shigenori; and Shinohara, Takeru, 4,696,551, Cl. 350-358.000.
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Matsui, Shigekazu; Kagaya, Kenichi; Ushida, Masao; and Maruyama, Kouichi, 4,696,877, Cl. 430-5.000.
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Hoyt, Robert E.: *See*—
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Fitts, Renee A.; Hsiung, Nancy; and Hamer, Dean H., 4,696,898, Cl. 435-68.000.
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Huang, Kuo C. Fan motor assembly support frame. 4,696,450, Cl. 248-661.000.
Hust, Mok K. Discharge assembly. 4,696,414, Cl. 222-67.000.
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Buddecke, Charles L.; and Graham, Robert F., Jr., 4,697,157, Cl. 331-78.000.
Clark, Robert T., 4,697,160, Cl. 333-103.000.
Grinberg, Jan; and Yamagishi, Frederick G., 4,697,247, Cl. 364-713.000.
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Slayman, Charles W.; and Figueroa, Luis, 4,696,648, Cl. 437-5.000.

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Hunger, Klaus: *See*—
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Hunter, Richard G.: *See*—
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Altmann, Horst-Dieter; and Haupt, Eberhard, 4,697,064, Cl. 219-217.000.

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Enomoto, Masao, 4,696,555, Cl. 350-634.000.

ICI Americas Inc.: *See*—
Yellin, Tobias O.; and Gilman, David J., 4,696,933, Cl. 514-275.000.

Iff, Rene, to Neotecha AG. Plastic lined rotatable valve. 4,696,323, Cl. 137-375.000.

Igarashi, Yuriko: *See*—
Okada, Yoshio; Ahiko, Nobuo; and Igarashi, Yuriko, 4,696,856, Cl. 428-321.500.

Igloo Corporation: *See*—
McGowan, Ronald C.; and Pham, Ninh G., 4,696,412, Cl. 220-335.000.

Ikai, Takasi: *See*—
Numata, Tatsuo; Hatanaka, Masataka; Watanabe, Junichi; Ikai, Takasi; Nawamaki, Tsutomu; and Hattori, Kenji, 4,696,694, Cl. 71-86.000.

Ikeda Bussan Co., Ltd.: *See*—
Shimomura, Kenji; Kouketsu, Shigeaki; Okuyama, Toru; and Sato, Take, 4,696,952, Cl. 521-107.000.

Ikeda, Yuji: *See*—
Ohtani, Teruo; Tamura, Toshihisa; Ikeda, Yuji; Araikawa, Mutsuya; and Kywata, Kazuyoshi, 4,696,635, Cl. 425-330.000.

Ikenaka, Tokuji; and Omichi, Kaoru, to Wako Pure Chemical Industries, Ltd. Modified oligosaccharides used as substrate for measuring α-amylase activity. 4,697,006, Cl. 536-17.200.

Ikita, Takao: *See*—
Deguchi, Takenori; Uchida, Kazuko; Ikita, Takao; Maruhaski, Shigeaki; Hoshino, Kazuo; and Oosaki, Keiji, 4,696,724, Cl. 204-27.000.

Ikushima, Kazuo: *See*—
Takeuchi, Kazumasa; Iwadachi, Takaharu; and Ikushima, Kazuo, 4,696,704, Cl. 148-412.000.

Imai, Takeshi: *See*—
Sugihara, Junpei; Imai, Takeshi; Toida, Shuzo; and Takahashi, Ikuzo, 4,697,027, Cl. 556-466.000.

Imanaka, Yoshiaki, to Sharp Kabushiki Kaisha. Cleaning device for a monochromatic copying machine. 4,696,565, Cl. 355-15.000.

Imperial Chemical Industries PLC: *See*—
Devonald, David P.; Nelson, Anthony J.; Quan, Peter M.; and Stewart, David, 4,696,801, Cl. 423-24.000.
Pinto, Alwyn, 4,696,871, Cl. 429-17.000.
Turnbull, Michael D.; and Kay, Ian T., 4,696,926, Cl. 514-230.000.
Williams, Ian G., 4,696,966, Cl. 524-412.000.
Yellin, Tobias O.; and Gilman, David J., 4,696,933, Cl. 514-275.000.

Imperial Group Public Limited Company: *See*—
Chard, Brian C.; Hooper, John D.; and Bale, Christopher R., 4,696,311, Cl. 131-109.100.

Inaba, Tsutomu: *See*—
Kimura, Tadashi; Sugihara, Masahiro; and Inaba, Tsutomu, 4,696,628, Cl. 418-15.000.

Inaba, Yoshiharu, to Fanuc Ltd. Mold opening/closing speed control device. 4,696,632, Cl. 425-150.000.

Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, to Canon Kabushiki Kaisha. Electrostatic recording method and apparatus. 4,697,196, Cl. 346-159.000.

Inamine, Edward S.: *See*—
Houck, David R.; Inamine, Edward S.; and Goetz, Michael A., 4,696,925, Cl. 514-219.000.

Incitti, Corkey. Camp stove. 4,696,282, Cl. 126-9.00R.

Independent Broadcasting Authority: *See*—
Tonge, Gary J., 4,697,206, Cl. 358-14.000.

Industrial Innovations, Inc.: *See*—
Urbania, William G., 4,696,073, Cl. 15-302.000.

Ingersoll Milling Machine Company, The: *See*—
Lewis, Henry W.; and Romero, Jorge E., 4,696,707, Cl. 156-64.000.

Ino, Kazuhide: *See*—
Obayashi, Tsutomo; Watanabe, Shinobu; and Ino, Kazuhide, 4,696,830, Cl. 427-41.000.

Inoue, Kenichi: *See*—
Funahashi, Masaya; Miyata, Teruhisa; Inoue, Kenichi; and Miyake, Akira, 4,696,869, Cl. 428-695.000.

Inoue, Masatsugu; and Yamazaki, Hidetoshi, to Kabushiki Kaisha Toshiba. Color cathode ray tube having a non-spherical curved mask. 4,697,119, Cl. 313-408.000.

Institut de Recherches de la Construction Navale: *See*—
Sicard, Claude; Kroczynski, Patrice; Gallard, Herve; Mars, Denis; and Devos, Michel, 4,697,239, Cl. 364-468.000.

Institut de Recherches de la Siderurgie Francaise: *See*—
Denier, Guy; and Henrion, Romain, 4,696,456, Cl. 266-44.000.

Institut National de la Sante et de la Recherche Medicale (INSERM): *See*—
Bisconte, Jean-Claude, 4,696,902, Cl. 435-300.000.
Sebille, Bernard; Beuzard, Yves; and Demarne, Henri, 4,696,937, Cl. 514-314.000.

Institute of Gas Technology: *See*—
Ghosh, Sambhunath; Chynoweth, David P.; and Tarman, Paul B., 4,696,746, Cl. 210-603.000.

Instytut Lotnictwa: *See*—
Traczyk, Jan; Brejnak, Jacek; and Kawalec, Krzysztof, 4,696,622, Cl. 415-211.000.

Instytut Odlewnictwa: *See*—
Grochal, Tadeusz; Ryglicki, Roman; and Wierzchowski, Wojciech, 4,696,337, Cl. 164-150.000.

Integrated Genetics, Inc.: *See*—
Fitts, Renee A.; Hsiung, Nancy; and Hamer, Dean H., 4,696,898, Cl. 435-68.000.

Intel Corporation: *See*—
Newton, Edward L.; and Swendrowski, Steven D., 4,696,526, Cl. 439-68.000.

International Business Machines: *See*—
Santini, Hugo A. A., 4,696,729, Cl. 204-224.00R.

International Business Machines Corporation: *See*—
Bissinger, Werner D., 4,696,717, Cl. 156-642.000.
Bonaccio, Anthony R., 4,697,099, Cl. 307-355.000.
Chappell, Barbara A.; and Schuster, Stanley E., 4,697,108, Cl. 307-475.000.
Decker, Dale D.; and Stanhope, Mary E., 4,696,426, Cl. 232-43.100.
Frushour, James E., 4,697,142, Cl. 324-158.00R.
Mansuria, Mohanlal S.; Meinert, Rolf G.; Oktay, Sevgin; and Ostergren, Carl D., 4,696,578, Cl. 374-45.000.
Mueller, Wolfgang F., 4,697,058, Cl. 219-56.210.
Stich, Michael C.; Resman, John B.; Ottesen, Hjalmar H.; and Anderson, Todd B., 4,697,127, Cl. 318-561.000.

International Computers Limited: *See*—
Desyllas, Peter L. L.; Holt, Nicholas P.; and Naven, Finbar, 4,697,268, Cl. 371-67.000.
Spillar, Alan; and Desyllas, Peter L. L., 4,697,234, Cl. 364-200.000.

International Flavors & Fragrances Inc.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,696,676, Cl. 44-7.500.

Irland, Thomas E. Fixture for a router. 4,696,331, Cl. 144-134.00D.

Isaksen, Robert A.: *See*—
Jones, Wallace R.; and Isaksen, Robert A., 4,696,848, Cl. 428-80.000.

Ishida, Mikio: *See*—
Ishimori, Shozo; Ishida, Mikio; Miki, Hiroyuki; Ishiizumi, Seiichi; and Hirata, Kazuo, 4,696,365, Cl. 180-233.000.

Ishiguro, Fujio; and Maeda, Hideo, to NGK Insulators, Ltd. Ceramic heater and a method of manufacturing the same. 4,697,165, Cl. 338-34.000.

Ishii, Taira: *See*—
Misawa, Yoshihiko; Ishii, Taira; and Maeda, Yoshinobu, 4,696,424, Cl. 227-84.000.

Ishiizumi, Seiichi: *See*—
Ishimori, Shozo; Ishida, Mikio; Miki, Hiroyuki; Ishiizumi, Seiichi; and Hirata, Kazuo, 4,696,365, Cl. 180-233.000.
Ishikawa, Fumihiko, to Shikoku Denryoku Kabushiki Kaisha. Inverter system for inputting alternating current and direct current in combination. 4,697,136, Cl. 323-267.000.
Ishikawa, Keisuke, to Alps Electric Co., Ltd. Casing for electronic devices. 4,697,044, Cl. 174-35.00R.
Ishimori, Shozo; Ishida, Mikio; Miki, Hiroyuki; Ishiizumi, Seiichi; and Hirata, Kazuo, to Kubota, Ltd. Four wheel drive vehicle. 4,696,365, Cl. 180-233.000.
Ishitani, Tohru; Tamura, Hifumi; and Umemura, Kaoru, to Hitachi, Ltd. Apparatus for implanting ion microbeam. 4,697,086, Cl. 250-492.200.
Ishitsubo, Kenji; and Abe, Yoshinobu, to Nissan Motor Company, Limited. Vehicle mirror arrangement. 4,697,065, Cl. 219-219.000.
Isobe, Mitsuo: *See*—
Ohtani, Takayuki; Isobe, Mitsuo; Aono, Akira; and Urakawa, Nobuaki, 4,697,112, Cl. 307-530.000.
Isoport Verbundbauteile Ges. m.b.H.: *See*—
Woltron, Herbert; and Huber, Christian, 4,696,459, Cl. 267-36.100.
Isover Saint-Gobain: *See*—
Cousin, Stephane; and Boumendil, Jean-Paul, 4,696,847, Cl. 428-76.000.
Isoyama, Toyoshiro; Yasuyuki, Goto; Ogawa, Tetsuya; and Sugimori, Shigeru, to Chisso Corporation. Ester compound. 4,696,759, Cl. 252-299.620.
Itabashi, Mitsuharu: *See*—
Aoyama, Masaaki; Itabashi, Mitsuharu; Miura, Mariko; and Kohno, Masahiro, 4,696,905, Cl. 436-64.000.
Itagaki, Takaharu; Kusano, Hiroshi; Miyata, Eiji; and Kubota, Hirohisa, to Mitsubishi Chemical Industries Ltd. Separating agent with fluoroalkyl group. 4,696,745, Cl. 210-502.100.
Itek Corporation: *See*—
Hutchin, Richard A., 4,696,573, Cl. 356-353.000.
Ito, Kazuo; Kudo, Toshiyuki; and Hama, Ritsuo, to Sanyo Electric Co., Ltd. Thermally improved photodetector having a roughened, recessed, raised or inclined light receiving surface. 4,697,074, Cl. 250-211.00R.
Ito, Shigenori, to NGK Insulators, Ltd. Composite ceramic structure and method for manufacturing the same. 4,696,777, Cl. 264-60.000.
Ito, Toshimitsu; and Murata, Chigaku, to Toyota Jidosha Kabushiki Kaisha. Method and device for control of internal combustion engine at end of fuel cut off. 4,696,278, Cl. 123-493.000.
Ito, Toshinobu: *See*—
Kohno, Kouji; Takubo, Hiroichi; and Ito, Toshinobu, 4,696,267, Cl. 123-192.00B.
Ito, Yukio: *See*—
Yamazaki, Jun; and Ito, Yukio, 4,696,879, Cl. 430-24.000.
Itoh, Takuyuki: *See*—
Hirano, Takahisa; Fukami, Shoji; Maruiwa, Yasuharu; Itoh, Takuyuki; Sugimoto, Tamio; Ono, Tetsuo; and Mukai, Masatoshi, 4,696,084, Cl. 29-156.40R.
ITT Corporation: *See*—
Heesch, Max O., 4,696,515, Cl. 297-374.000.
Iversen, Arthur H. Liquid cooled ferrofluid-type rotating seals. 4,696,481, Cl. 277-80.000.
Iwadachi, Takaharu: *See*—
Takeuchi, Kazumasa; Iwadachi, Takaharu; and Ikushima, Kazuo, 4,696,704, Cl. 148-412.000.
Iwahashi, Hiroshi; Asano, Masamichi; Momodomi, Masaki; Minagawa, Hidenobu; Suzuki, Kazuto; and Narita, Akira, to Kabushiki Kaisha Toshiba; Toshiba Micro-Computer Engineering Corp.; and Tosbac Computer System Co., Ltd. Read/write control circuit. 4,697,101, Cl. 307-452.000.
Iwamura, Yoshio: *See*—
Miyagawa, Teiji; Iwamura, Yoshio; and Hayakawa, Masao, 4,696,452, Cl. 251-25.000.
Izuo, Takashi: *See*—
Yamamoto, Toshiaki; Kako, Hiroyoshi; Shibata, Takuo; Izuo, Takashi; Kamimae, Hajime; and Takegawa, Hiroaki, 4,696,379, Cl. 188-299.000.
Izuwa, Akio; and Yamaguchi, Tadanobu, to Mitsubishi Jukogyo Kabushiki Kaisha. Electronic beam welding method for screen cylinder. 4,697,060, Cl. 219-121.0ED.
Izzi, Anthony J., to Mateer Burt Co., Inc. Feedback control for automatic filling machine. 4,696,329, Cl. 141-1.000.
J. I. Case Company: *See*—
Harwood, J. Richard; and Bell, Frank A., 4,696,349, Cl. 172-323.000.
Jack, James: *See*—
Bentley, Robert L.; Hoyle, William; and Jack, James, 4,696,763, Cl. 252-391.000.
Jacobelli, Alain: *See*—
Doriath, Gerard; Hartemann, Pierre; and Jacobelli, Alain, 4,697,145, Cl. 324-244.000.
Jacobson, Kenneth A.; Daly, John W.; and Kirk, Kenneth L., to United States of America, Health and Human Services. Biologically-active xanthine derivatives. 4,696,932, Cl. 514-263.000.
James A. Rhodes & Associates: *See*—
Wren, Michael; Lantz, Paul W.; Acock, George W., Jr.; and Rhodes, James A., 4,696,133, Cl. 52-80.000.
Jameson, Samuel M.: *See*—
Genereaux, Eugene P.; Jameson, Samuel M.; and Brooks, Timothy K., 4,696,460, Cl. 269-6.000.
Janatpour, Mojtaba; and Shafer, Sheldon J., to General Electric Company. Process for making diaryl carbonates. 4,697,034, Cl. 558-274.000.
Janes, Norman F.: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,696,944, Cl. 514-531.000.
Janome Sewing Machine, Co. Ltd.: *See*—
Kato, Kenji; and Sano, Yasuro, 4,696,245, Cl. 112-264.100.
Jantzen, Steven L.: *See*—
Billingsley, Robert H., Jr.; Jantzen, Steven L.; O'Leary, Walter E.; and Krug, John A., 4,696,238, Cl. 105-248.000.
Japan Tobacco, Inc.: *See*—
Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.
Japanese National Railways: *See*—
Mochizuki, Asahi; Ozawa, Kira; Fujita, Shinichiro; and Yamada, Kuniaki, 4,696,446, Cl. 246-169.00S.
Jarvinen, W. Bruce; and Lukas, Stephen J., to General Electric Company. Control method for direct current motor. 4,697,126, Cl. 318-331.000.
Jaxa-Chamiec, Albert A.: *See*—
Ellames, George J.; and Jaxa-Chamiec, Albert A., 4,696,928, Cl. 514-250.000.
Jecmen, John J.: *See*—
Matthews, Ronald; and Jecmen, John J., 4,696,375, Cl. 187-58.000.
Jenning, Michael; and Mackenthun, Holger, to Angewandte Digital Elektronik. Means for non-contacting signal and energy transmission. 4,697,183, Cl. 340-870.250.
Jensen, Eric A.; Hitchin, James; Tsai, Albert G.; and Arrhenius, Gustaf O., to Thermal Energy Stroage, Inc. Latent heat storage and transfer system and method. 4,696,338, Cl. 165-1.000.
JEOL Ltd.: *See*—
Aoyama, Masaaki; Itabashi, Mitsuharu; Miura, Mariko; and Kohno, Masahiro, 4,696,905, Cl. 436-64.000.
Jige, Masanobu: *See*—
Mochizuki, Masatsugu; Jige, Masanobu; and Umemura, Yoshihiro, 4,696,672, Cl. 604-128.000.
Jines, Michael D.: *See*—
Clark, Brian C.; and Jines, Michael D., 4,696,361, Cl. 180-68.400.
Jinriki, Tatenori; and Kozawa, Fusaaki, to Hitachi, Ltd. Wrist mechanism for industrial robot. 4,696,202, Cl. 74-479.000.
Johansson, Bjorn-Olow: *See*—
Bolmstedt, Ulf; and Johansson, Bjorn-Olow, 4,696,341, Cl. 165-101.000.
John Fluke Mfg. Co., Inc.: *See*—
Epperson, David L., 4,696,860, Cl. 428-325.000.
Johnen, Rolf; Kirch, Hans; and Otto, Volkmar, to Goetze AG. Elastic shaft coupling for transmission of torque between shafts. 4,696,657, Cl. 464-93.000.
Johnson, Howard B., to Consolidated Ceramic Products, Inc. Zircon and MgO preheatable insulating refractory liners and methods of use thereof. 4,696,455, Cl. 266-44.000.
Johnson & Johnson Baby Products Company: *See*—
Lukenbach, Elvin R.; Naik-Satam, Prakash; and Schwartz, Anthony M., 4,696,773, Cl. 260-513.00R.
Johnson, Lee A., Sr. Clutch and brake apparatus. 4,696,381, Cl. 192-17.00R.
Johnson Matthey Public Limited Company: *See*—
Stoddart, James F.; and Alston, David R., 4,696,918, Cl. 514-58.000.
Joliot, A. Pierre; and Beal, Daniel, to Centre National de la Recherche Scientifique (C.N.R.S.). Spectrophotometer with statistically balanced light for very high resolution. 4,696,570, Cl. 356-319.000.
Jones, Howard: *See*—
Suh, John T.; Piwinski, John J.; Jones, Howard; and Neiss, Edward S., 4,696,939, Cl. 514-361.000.
Jones, Michael M.; Miller, Walter E., Jr.; and Mitchell, Robert R., to United States of America, Army. Missile referenced beamrider. 4,696,441, Cl. 244-3.130.
Jones, Roger E.: *See*—
Extance, Philip; and Jones, Roger E., 4,697,146, Cl. 324-244.000.
Pitt, Gilles D.; Extance, Philip; and Jones, Roger E., 4,696,543, Cl. 350-96.230.
Jones, Wallace R.; and Isaksen, Robert A., to Excello Specialty Company, The. Surface protector with expansible pocket. 4,696,848, Cl. 428-80.000.
Jornhagen, Lennart, to Forsheda AB. Device for removing dirt from a surface, especially a brush sealing device. 4,696,480, Cl. 277-53.000.
Jost, Manfred; Knoke, Jurgen; Yoshida, Zenji; Ohta, Noburo; and Nakanishi, Terumo, to Carl Freudenberg, Firma. Iron-on interlining composite of knit layer and nonwoven layer of similar structure. 4,696,850, Cl. 428-197.000.
Jurs, Jeffry W.: *See*—
Boytor, Samuel G.; and Jurs, Jeffry W., 4,697,231, Cl. 364-188.000.
Kabelmetal Electro Gesellschaft mit beachrankter Haftung: *See*—
Schauer, Friedrich; and Berthold, Hans, 4,696,523, Cl. 439-11.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Asari, Akira; and Tabuchi, Takahisa, 4,696,176, Cl. 72-273.500.
Kabushiki Kaisha Kyoritsu Yuki Kogyo Kenkyusho: *See*—
Mochizuki, Tadao; Nakajima, Akira; and Fukushima, Reizo, 4,696,740, Cl. 210-151.000.
Kabushiki Kaisha Toshiba: *See*—
Arimitsu, Hiroshi; Hatano, Kiyoshi; Nakanishi, Teruyuki; Yoshimura, Yoshio; Urabe, Masaki; and Honda, Tsurakazu, 4,697,179, Cl. 340-825.720.
Higashino, Hiroyuki; and Ohkawa, Hideki, 4,696,721, Cl. 204-3.000.

Inoue, Masatsugu; and Yamazaki, Hidetoshi, 4,697,119, Cl. 313-408.000.

Iwahashi, Hiroshi; Asano, Masamichi; Momodomi, Masaki; Minagawa, Hidenobu; Suzuki, Kazuto; and Narita, Akira, 4,697,101, Cl. 307-452.000.

Kitamura, Shunji, 4,697,213, Cl. 360-78.000.

Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; Morita, Mikio; and Kamohara, Hisato, 4,696,725, Cl. 252-62.540.

Ohtani, Takayuki; Isobe, Mitsuo; Aono, Akira; and Urakawa, Nobuaki, 4,697,112, Cl. 307-530.000.

Ono, Akira, 4,696,572, Cl. 356-348.000.

Sakata, Hirotsugu; Nagatomo, Shigemi; Hayano, Makoto; and Hatori, Mitsuo, 4,696,630, Cl. 418-55.000.

Watanabe, Junji, 4,696,564, Cl. 355-14.00R.

Yagasaki, Eriko; Kanda, Motoya; Mitsuyasu, Kiyoshi; and Sato, Yuji, 4,696,873, Cl. 429-59.000.

Kagaya, Kenichi: *See*—
Matsui, Shigekazu; Kagaya, Kenichi; Ushida, Masao; and Maruyama, Kouichi, 4,696,877, Cl. 430-5.000.

Kageyama, Bunji: *See*—
Sonoyama, Takayasu; Yagi, Shigeo; and Kageyama, Bunji, 4,696,897, Cl. 435-42.000.

Kai, Isao, to Omron Tateisi Electronics Co. Contact lens sterilization device. 4,697,070, Cl. 219-521.000.

Kaifu, Rokuro: *See*—
Hinohara, Yoshikazu; Kaifu, Rokuro; and Matsunaga, Isao, 4,696,919, Cl. 514-62.000.

Kakegawa, Kazuyuki: *See*—
Shirasaki, Shin-ichi; Hotta, Yasunari; Yamamura, Hiroshi; Matsuda, Shin-ichi; Kakegawa, Kazuyuki; Moriyoshi, Yusuke; Takahashi, Koichiro; and Haneda, Hajime, 4,696,810, Cl. 423-593.000.

Kakehi, Tohru: *See*—
Matsui, Katsumasa; Ohba, Masahiro; Kakehi, Tohru; and Kawai, Takayoshi, 4,696,167, Cl. 62-180.000.

Kakizaki, Tetsuji; Mizutani, Toshikazu; and Yui, Hiroshi, to Mitsubishi Petrochemical Co., Ltd. Semiconductive resin composition. 4,696,765, Cl. 252-511.000.

Kako, Hiroyoshi: *See*—
Yamamoto, Toshiaki; Kako, Hiroyoshi; Shibata, Takuo; Izuo, Takashi; Kamimae, Hajime; and Takegawa, Hiroaki, 4,696,379, Cl. 188-299.000.

Kakugo, Masahiro: *See*—
Shiga, Akinobu; Kakugo, Masahiro; Kozima, Junpei; and Wakatsuki, Kizuku, 4,696,979, Cl. 525-247.000.

Kalathakis, Kyriacos: *See*—
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Kaleskas, Edward: *See*—
Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, 4,696,671, Cl. 604-67.000.

Kallianos, Andrew G.; and Kounnas, Christopher N., to Philip Morris Incorporated. Filter cigarette. 4,696,314, Cl. 131-336.000.

Kallinger, Franz; and Killion, Mark E., to Custodis-Cottrell, Inc. Method and apparatus for constructing towers. 4,696,135, Cl. 52-121.000.

Kalokitis, David: *See*—
Sechi, Franco N.; and Kalokitis, David, 4,697,159, Cl. 333-24.00C.

Kaltmann, Hans-Joachim; and Schaper, Hermann, to Rheinmetall GmbH. Device for destroying water mines and mine-sweeping method. 4,696,234, Cl. 102-308.000.

Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Compounds containing a fluorobiphenylyl group and their use in liquid crystal material and devices. 4,696,549, Cl. 350-350.00R.

Kamata, Kazumasa; Ueda, Kazuo; and Kitai, Kiyokazu, to Mitsubishi Rayon Co., Ltd. Impact modifier and thermoplastic resin composition using the same. 4,696,973, Cl. 525-71.000.

Kameda, Toshinori, to National Can Corporation. Method for detecting sterilization. 4,696,580, Cl. 374-162.000.

Kamewa AB: *See*—
Haglund, Kjell, 4,696,650, Cl. 440-49.000.

Kameya, Kazuo, to Elmec Corporation. Variable delay line system. 4,697,162, Cl. 333-161.000.

Kamimae, Hajime: *See*—
Yamamoto, Toshiaki; Kako, Hiroyoshi; Shibata, Takuo; Izuo, Takashi; Kamimae, Hajime; and Takegawa, Hiroaki, 4,696,379, Cl. 188-299.000.

Kamino, Yoshikazu: *See*—
Funahashi, Yoshiko; Kamino, Yoshikazu; Matsumura, Yasuharu; and Harimaya, Senichi, 4,696,795, Cl. 422-56.000.

Funahashi, Yoshiko; Kamino, Yoshikazu; Matsumura, Yasuharu; and Harimaya, Senichi, 4,696,906, Cl. 436-78.000.

Kamohara, Hisato: *See*—
Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; Morita, Mikio; and Kamohara, Hisato, 4,696,725, Cl. 252-62.540.

Kanagawa, Shuuichi: *See*—
Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.

Kanai Juyo Kogyo Kabushiki Kaisha: *See*—
Nakamura, Ritsuji, 4,696,080, Cl. 19-114.000.

Kanai, Masahiro: *See*—
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Hargarten, Werner; and Kautz, Rudolf, 4,696,709, Cl. 156-79.000.

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Funahashi, Yoshiko; Kamino, Yoshikazu; Matsumura, Yasuharu; and Harimaya, Senichi, 4,696,795, Cl. 422-56.000.
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Ohtani, Teruo; Tamura, Toshihisa; Ikeda, Yuji; Araikawa, Mutsuya; and Kywata, Kazuyoshi, 4,696,635, Cl. 425-330.000.

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Ali, Sameh A. H.; and Haag, Juergen, 4,696,768, Cl. 252-628.000.

Keve, Tibor: *See*—
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Kim, Tuk M. Method of treatment during withdrawl from drug dependency. 4,696,818, Cl. 424-195.100.

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Wideman, Ronald H., 4,696,779, Cl. 264-211.130.

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Kato, Akira; Otobe, Yutaka; and Kimura, Shigehiro, 4,696,272, Cl. 123-339.000.
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Kinzenbaw, Jon E. Apparatus for leveling a combine. 4,696,152, Cl. 56-209.000.

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Johnen, Rolf; Kirch, Hans; and Otto, Volkmar, 4,696,657, Cl. 464-93.000.

Kirk, Kenneth L.: *See*—
Jacobson, Kenneth A.; Daly, John W.; and Kirk, Kenneth L., 4,696,932, Cl. 514-263.000.

Kiselewski, Donald L. Modular structure, stud therefor, and method of construction. 4,696,139, Cl. 52-426.000.

Kiser, Donald L., to Grain Processing Corporation. Removal of water from aqueous alcohol mixtures. 4,696,720, Cl. 203-19.000.

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Kita, Yasuo, to Shimadzu Corporation. Deceleration control system for automobiles. 4,696,380, Cl. 192-4.00A.

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Kleinschmit, Peter: *See*—
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Klinner, Wilfred E., to National Research Development Corporation. Crop engaging device and method. 4,696,154, Cl. 56-364.000.

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Roggendorff, Martin, 4,696,262, Cl. 123-41.690.

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Ude, Werner; Knebel, Joachim; and Schroeder, Guenter, 4,696,993, Cl. 528-167.000.

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Knowles, Robert G., to Western Geophysical Company of America. Fiber optic cable connector. 4,696,539, Cl. 350-96.210.

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Bezler, Wilhelm; and Kobler, Ingo, 4,696,229, Cl. 101-177.000.

Koch, Friedhelm: *See—*
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Scholl, Hans; Thiele, Horst; and Hagemann, Eckhard, 4,696,242, Cl. 112-121.140.

Kohl, James E.: *See—*
Harnden, John D., Jr.; Kornrumpf, William P.; Kohl, James E.; and Adler, Michael S., 4,697,118, Cl. 310-331.000.

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Kojima, Tstsuro: *See—*
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Kojima, Yuichi: *See—*
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Komai, Atsushi: *See—*
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Komatsu, Shinichi, to Atsugi Motor Parts Company, Limited. Power assist device for automotive steering system. 4,696,198, Cl. 74-388.0PS.

Komine, Shigeo: *See—*
Kato, Mikihiko; Komine, Shigeo; Morita, Kazuhiko; and Okuzawa, Yasutoshi, 4,696,846, Cl. 428-65.000.

Komiyama, Makoto: *See—*
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Okabe, Takahiro; Hayashi, Makoto; Morisuye, Katuhiro; Watanabe, Tomoyuki; Washio, Katsuyoshi; Ogura, Setsuo; Furihata, Makoto; and Kondo, Shizuo, 4,697,102, Cl. 307-454.000.

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Shoji, Hisashi; Haneda, Satoshi; and Hiratsuka, Seiichiro, 4,696,880, Cl. 430-42.000.

Kopka, Ihor E.: *See—*
Boulton, David A.; Kopka, Ihor E.; Moore, Vernon L.; and Pessolano, Arsenio A., 4,697,012, Cl. 544-124.000.

Kopp, Reiner H.; and Panetz, Allen I., to Biochemical Diagnostics, Inc. Chromatography method. 4,696,187, Cl. 73-61.10C.

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Kosha, Hideaki: *See—*
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Koski, Gerald L.: *See—*
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Kosoczky, Ibolya: *See—*
Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Pallos, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.

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Kotliar, Abraham M.: *See—*
Sibilia, John P.; Kotliar, Abraham M.; Murthy, Narasimhaiah S.; and Sacks, William, 4,696,857, Cl. 428-323.000.

Kouketsu, Shigeaki: *See—*
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Kounnas, Chrisopher N.: *See—*
Kallianos, Andrew G.; and Kounnas, Christopher N., 4,696,314, Cl. 131-336.000.

Kousaka, Kunimitsu; and Gotoh, Kunihiko, to Fujitsu Limited. Semiconductor integrated circuit having improved load drive characteristics. 4,697,154, Cl. 330-277.000.

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Jinriki, Tatenori; and Kozawa, Fusaaki, 4,696,202, Cl. 74-479.000.

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Shiga, Akinobu; Kakugo, Masahiro; Kozima, Junpei; and Wakatsuki, Kizuku, 4,696,979, Cl. 525-247.000.

Kramer & Grebe GmbH & Co. KG: *See—*
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Krappen, Wolfgang: *See—*
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Kraus, Gabriella: *See—*
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Kreiseder, Walter J., to Courtesy Mold & Tool Corporation. Closure with side cut tamper evident feature. 4,696,410, Cl. 220-267.000.

Kroczynski, Patrice: *See—*
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Kubota, Hirohisa: *See—*
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Kubota, Masato: *See—*
Sasaki, Torahiko; Sato, Kazuo; Ohkawa, Masahiro; Suzuki, Yoshihiro; Kubota, Masato; Nakao, Hatsuo; and Tange, Kyoichi, 4,696,870, Cl. 429-14.000.

Kudo, Toshiyuki: *See—*
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Felten, Klaus; Honroth, Walter; Kuhn, Siegfried; Schulten, Hermann; and Zeller, Bruno, 4,696,209, Cl. 82-40.00R.

Kulik, Helmut. Oxygen carrier. 4,696,420, Cl. 224-275.000.

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Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,697,237, Cl. 364-424.000.

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Kunick, Klaus: *See—*
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Kunikane, Makoto: *See*—
Abe, Michiharu; Umehara, Masaakira; Sato, Tsutomu; Oba, Hideaki; Ueda, Yutaka; and Kunikane, Makoto, 4,696,892, Cl. 430-495.000.
Kunkel, Heinrich: *See*—
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Kurata, Masami: *See*—
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Okada, Yoshio; Ahiko, Nobuo; and Igarashi, Yuriko, 4,696,856, Cl. 428-321.500.
Kurkela, Kauko O. A.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,696,949, Cl. 514-648.000.
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Okamura, Kiyohito; Hasegawa, Yoshio; Kuroo, Yoshiyasu; and Ugaji, Masana, 4,696,827, Cl. 427-36.000.
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Germundson, Lars, 4,697,063, Cl. 219-213.000.
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La Batteria di M. Tadiello S.r.l.: *See*—
Tadiello, Mario, 4,696,874, Cl. 429-64.000.
La Telemecanique Electrique: *See*—
Ruaud, Xavier, 4,697,052, Cl. 200-43.070.
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Savonlahti, Jukka; Ekholm, Pertti; and Harjunmaa, Hannu, 4,696,195, Cl. 73-864.840.
Lacey, David: *See*—
Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, 4,696,549, Cl. 350-350.00R.
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Laipply, Thomas C. Applicator wipe for inviscid fluids. 4,696,393, Cl. 206-210.000.
Lalere, Jean-Christophe: *See*—
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Owen, Murl, 4,696,903, Cl. 436-28.000.
Lama, William L.; and Harrigan, Michael E., to Xerox Corporation. Short focal length imaging device. 4,696,545, Cl. 350-167.000.
Landes, James L., to Texas Instruments Incorporated. Programmable ultrasonic power supply. 4,696,425, Cl. 228-1.100.
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Hagglund, Lars, 4,696,780, Cl. 264-222.000.
Lang, Gerard: *See*—
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Chaffy, Joseph; and Langon, Bernard, 4,696,730, Cl. 204-243.00M.
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Wren, Michael; Lantz, Paul W.; Acock, George W., Jr.; and Rhodes, James A., 4,696,133, Cl. 52-80.000.
Lardellier, Alain M. J., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.". Housing for a turbojet engine compressor. 4,696,619, Cl. 415-138.000.
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Lasater, Henry C. Water purification device. 4,696,718, Cl. 202-176.000.
Laue, Hans-Bodo, to Nixdorf Computer AG. Receiving circuit for signal transmission systems. 4,697,275, Cl. 375-4.000.
Lavi, Yoav, to Simulog, Inc. Hardware logic simulator. 4,697,241, Cl. 364-488.000.
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Lawhon, Robert A.; Heithoff, Robert B.; and Gonzalez, Wayne H., to PPG Industries, Inc. Method of glass batch preheating and liquefying with recycling of particulates. 4,696,691, Cl. 65-27.000.
Lay, Tsay T. Direction-changeable structure of hand tool handle. 4,696,208, Cl. 81-58.000.
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Le, Sinh: *See*—
Farel, Alain; Agobian, Manuel; and Le, Sinh, 4,697,050, Cl. 178-18.000.
LeBlanc, J. T. Foldable shelter system and method of construction. 4,696,132, Cl. 52-69.000.
LeBlanc, Jean, to Robert Bosch GmbH. Fuel injection pump. 4,696,271, Cl. 123-299.000.
Leboure, Gerald J. P. B.: *See*—
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le Chatelier, Robert; Sinic, Andre ; and Diefenbach, Jean-Jacques, to Precision Mecanique Labinal. Deflating device for pneumatic tires of vehicles. 4,696,334, Cl. 152-417.000.
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Ethier, Dolores O., 4,696,854, Cl. 428-287.000.
Ledin-Bonevik, Birgitta B. M. Colon irrigator for use within a toilet basin. 4,696,673, Cl. 604-150.000.
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Lee, Hsiao-Peng S.; and Spannagel, Ulrich, to Amdahl Corporation. Flexible computer control unit. 4,697,250, Cl. 364-900.000.
Lee, James D. Vehicle steering wheel and shift lever guard. 4,696,173, Cl. 70-427.000.
Lee, Robert E. Oscillating weight carriers. 4,696,485, Cl. 280-221.000.
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Legg, Keith O., to Georgia Tech Research Corporation. Process for increasing the wear life of ceramic dies and parts. 4,696,829, Cl. 427-38.000.
Lehning, Heinz, to Motorola, Inc. High voltage amplifier. 4,697,155, Cl. 330-297.000.
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Leinert, Herbert, to Boehringer Mannheim GmbH. Process for the preparation of optically-active carbazole derivatives, new R- and S-carbazole derivatives and pharmaceutical compositions containing these compounds. 4,697,022, Cl. 548-444.000.
Lem, Hans J. Conveyor system diverter turn assembly. 4,696,386, Cl. 198-372.000.
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Lenk, Erich; and Feth, Max, to Barmag AG. Melt spinning apparatus. 4,696,633, Cl. 425-192.00S.
Lenz, August: *See*—
Lenz, Bernhard; and Lenz, August, 4,696,433, Cl. 241-199.120.
Lenz, Bernhard; and Lenz, August. Breaking up device for use in straining tuns to obtain wort in the production of beer. 4,696,433, Cl. 241-199.120.
Leo, Rolf; Meusel, Karl-Heinz; and Uttner, Alfred, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Wheel set for rail vehicles. 4,696,506, Cl. 295-38.000.
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Lesauliner, Guy; and Savary, Fernand, to Framatome. Electromagnetic control bar drive device, with reduced heat losses. 4,696,783, Cl. 376-228.000.
Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 1,6-dihydro-6-oxo-3-pyridinecarbonitriles, intermediates for cardiotonic agents. 4,697,021, Cl. 546-288.000.
Leusner, Steven J.; Raphael, Barbara C.; and Swanhart, William G., Jr., to General Foods Corporation. Process for manufacture of emulsions containing soy protein. 4,696,826, Cl. 426-565.000.
Lewis, Henry W.; and Romero, Jorge E., to Ingersoll Milling Machine Company, The. Composite tape placement apparatus with natural path generation means. 4,696,707, Cl. 156-64.000.
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Libor, Endre: *See—*
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Liebenow, Walter: *See—*
Kisielowski, Lothar; Grafe, Ingomar; Liebenow, Walter; and Ahrens, Kurt H., 4,697,035, Cl. 558-344.000.

Lilley, Martin A., to Ampex Corporation. System for generating a synchronizing signal in response to two timing reference signals. 4,697,207, Cl. 358-17.000.

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Child, Ralph G.; Fields, Thomas L.; Wilkinson, Raymond G.; and Lin, Yang-I, 4,696,936, Cl. 514-297.000.

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Lindae, Gerhard; Perthus, Peter; and Rein, Heinz, to Robert Bosch GmbH. Headlamp, particularly of rectangular configuration, for use as antidazzle lamp on motor vehicles. 4,697,225, Cl. 362-61.000.

Lindberg, John E., to Combustion Control Developments, Ltd. Combustion control system. 4,696,279, Cl. 123-570.000.

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Durr, Dieter, 4,696,421, Cl. 225-1.000.

Lindner, Goerg H., to M&T Chemicals Inc. Chemical vapor deposition method of producing fluorine-doped tin oxide coatings. 4,696,837, Cl. 427-255.300.

Lindstrom, Richard L.; and Skelnik, Debra L. Irrigation solution. 4,696,917, Cl. 514-54.000.

Link, Charles T.; Gray, Bennie M.; and Shumaker, Harold L., to American Standard Inc. Pneumatic pressure actuator. 4,696,223, Cl. 92-86.500.

Lish, Charles A., to Standard Microsystems Corp. Cascode auto bias circuit. 4,697,153, Cl. 330-277.000.

Litman, Michael: *See—*
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Livingston, Andrew D., to Guaranty Performance Co., Inc. Mounting structure for rotary drum dryer. 4,696,116, Cl. 34-108.000.

Livsey, Duncan J.: *See—*
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LLoyd-Williams, Andrew, to BOC Group, Inc., The. PSA assembly. 4,696,681, Cl. 55-28.000.

Lobl, Helmut: *See—*
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Lockard, Joseph L., to AMP Incorporated. Rocker switch. 4,697,053, Cl. 200-68.200.

Lockheed Corporation: *See—*
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Lockwood, Larry R.; Gleason, Kimberly R.; and Strid, Eric W., to Cascade Microtech, Inc. Wafer probe. 4,697,143, Cl. 324-158.00P.

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Lowe, Gary M., to Devoke Co. Cabinet for microcomputer components. 4,696,522, Cl. 312-297.000.

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Daigle, Richard A., Sr.; Stanfield, William G.; and Crenshaw, Michael E., 4,696,602, Cl. 405-205.000.
Richardson, Eugene M.; Brehm, Norbert O.; and Null, Larry G., 4,696,377, Cl. 188-170.000.

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Wang, David T. K.; and Wilson, Philip J., 4,697,261, Cl. 370-32.100.

M.A.N.-B&W Diesel GmbH: *See—*
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Mallette, Robert P.: *See—*
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Markow, Margaret. Ridable recreation device. 4,696,467, Cl. 272-114.000.
Marks, George R. Reversible mortise lockset. 4,696,174, Cl. 70-451.000.
Marks, Jeffrey C., to Deere & Company. Three-speed planetary transmission. 4,696,205, Cl. 74-767.000.
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Klinner, Wilfred E., 4,696,154, Cl. 56-364.000.
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Neft, Charles L., to Westinghouse Electric Corp. AC power supplied static switching apparatus having energy recovery capability. 4,697,230, Cl. 363-163.000.
Neil, Jeffrey T., to GTE Laboratories Incorporated. Process for sintering silicon nitride articles. 4,696,778, Cl. 264-65.000.
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Bankuty, Geza E.; and Byron, LeRoy F., 4,696,144, Cl. 53-331.500.
Newton, Edward L.; and Swendrowski, Steven D., to Intel Corporation. Carrier for tape automated bonded semiconductor device. 4,696,526, Cl. 439-68.000.
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Nicol, Thomas H.: *See*—
Niemann, Ralph C.; Gonczy, John D.; and Nicol, Thomas H., 4,696,169, Cl. 62-514.00R.
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Murphy, Kenneth E.; Martin, Ronald A.; and Nies, Gary M., 4,696,660, Cl. 464-170.000.
Niesor, Eric: *See*—
Bentzen, Craig L.; Guyon-Gellin, Yves; Kalathakis, Kyriacos; Phan, Hieu T.; Nguyen Mong, Lan; Niesor, Eric; and Rossier, Jean-Robert, 4,696,920, Cl. 514-89.000.
Nifco, Inc.: *See*—
Fukuhara, Kunihiro, 4,696,128, Cl. 49-492.000.
Niggemeyer, Gert G. High-tension capacitor-discharge ignition apparatus for internal combustion engines. 4,696,280, Cl. 123-598.000.
Niibe, Masahito: *See*—
Kaneko, Norio; and Niibe, Masahito, 4,697,222, Cl. 361-321.000.
Niikura, Akio: *See*—
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Nikles, Albert: *See*—
Brandt, Hermann; Fischer, Hermann; Dreher, Hermann; Heil, Eduard; Hambrecht, Juergen; Naarmann, Herbert; Echte, Adolf; Gausepohl, Hermann; Siebel, Peter; Swoboda, Johann; Schwoebel, Gerd; and Nikles, Albert, 4,696,996, Cl. 528-214.000.
Nippon Air Brake Co., Ltd.: *See*—
Hata, Yasuhisa; Hatimaki, Takeshi; and Ogura, Satoshi, 4,696,626, Cl. 417-312.000.
Nippon Colin Co., Ltd.: *See*—
Warnagiris, Thomas J.; and McGinnis, William H., 4,697,166, Cl. 340-310.00R.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Hamanaga, Shinji, 4,696,454, Cl. 251-321.000.
Ichiki, Tetsuji, 4,696,214, Cl. 84-1.010.
Takanashi, Hiroyoshi, 4,697,259, Cl. 369-75.200.
Nippon Piston Ring Co., Ltd.: *See*—
Fujita, Yoshiaki; and Kawai, Satoshi, 4,696,696, Cl. 75-246.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Nishida, Soji; and Miyake, Nobuhiko, 4,696,587, Cl. 384-536.000.
Tanaka, Yasuo; and Niikura, Akio, 4,696,588, Cl. 384-615.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Okafuji, Masaharu; Ochi, Yoshinori; Miyake, Atsushi; Noguchi, Junichi; and Matsuo, Ichiro, 4,696,713, Cl. 156-358.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Morimoto, Yutaka; Saotome, Minoru; and Komai, Atsushi, 4,696,760, Cl. 252-314.000.
Nippon Soken, Inc.: *See*—
Ueno, Yoshiki; Taguchi, Takasi; and Hattori, Tadashi, 4,696,548, Cl. 350-338.000.
Nippon Steel Corporation: *See*—
Hirai, Hidefumi; Komiyama, Makoto; Hara, Susumu; and Wada, Keiichiro, 4,696,682, Cl. 55-68.000.
Nippondenso Co., Ltd.: *See*—
Asano, Hideo; Makida, Kazuhisa; and Fujiwara, Kenichi, 4,696,627, Cl. 418-15.000.
Katayama, Takeshi, 4,696,277, Cl. 123-479.000.
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Nanba, Sinzi; Matsui, Kazuma; Mizuno, Toru; and Goto, Tukasa, 4,696,193, Cl. 73-861.220.
Senda, Eiichi, 4,696,658, Cl. 464-112.000.
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Yamauchi, Yoshiyuki; Ohara, Toshio; and Takahashi, Toshio, 4,696,342, Cl. 165-152.000.
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Nishio, Kazuaki: *See*—
Nakajima, Kohei; Nishio, Kazuaki; and Watanabe, Hiroshi, 4,696,994, Cl. 528-176.000.
Nishioka, Jim Z. Projectile shooting guide for bows. 4,696,281, Cl. 124-25.000.
Nishiyama, Hiroshi: *See*—
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Nissan Chemical Industries Ltd.: *See*—
Numata, Tatsuo; Hatanaka, Masataka; Watanabe, Junichi; Ikai, Takasi; Nawamaki, Tsutomu; and Hattori, Kenji, 4,696,694, Cl. 71-86.000.
Nissan Motor Company, Limited: *See*—
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Hayashi, Yoshimasa, 4,696,261, Cl. 123-41.210.
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Nisshin Steel Co., Ltd.: *See*—
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Nitt, Karl-Heinz, to Siemens Aktiengesellschaft. Apparatus for compression molding of coil end turns. 4,696,631, Cl. 425-117.000.
Nittan Company, Limited: *See*—
Kimura, Tetsuo, 4,697,172, Cl. 340-587.000.
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Laue, Hans-Bodo, 4,697,275, Cl. 375-4.000.
Nobukawa, Akira; Sawaguchi, Tatsue; and Kuroki, Yoshihiro. Chucking device for machine tools. 4,696,513, Cl. 279-121.000.
Noe, Stephen A., to M. W. Kellogg Company, The. Ammonia synthesis converter. 4,696,799, Cl. 422-148.000.
Noguchi, Junichi: *See*—
Okafuji, Masaharu; Ochi, Yoshinori; Miyake, Atsushi; Noguchi, Junichi; and Matsuo, Ichiro, 4,696,713, Cl. 156-358.000.
Noh, Chuji, to Tokiwa Kogyo Co., Ltd. Film tubing device for use in packaging apparatus. 4,696,147, Cl. 53-550.000.
Nohira, Hidetaka, to Toyota Jidosha Kabushiki Kaisha. Device for varying a valve timing and lift for an internal combustion engine. 4,696,265, Cl. 123-90.160.
Nohl, Gerd: *See*—
Rohr, Gustav; and Nohl, Gerd, 4,696,246, Cl. 112-272.000.
Nonaka, Yuzo, to Disco Abrasive Systems, Ltd. Semiconductor wafer mounting and cutting system. 4,696,712, Cl. 156-351.000.
Noonan, John M.; and Caccamo, Anthony F., to Eastman Kodak Company. Novel photocrosslinkable liquid crystalline polymers. 4,696,990, Cl. 526-304.000.
Northern Telecom Limited: *See*—
Lafrance, Conrad D.; and Fatovic, Peter, 4,697,283, Cl. 379-443.000.
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Rivoli, Mark S., 4,696,395, Cl. 206-334.000.
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Nothofer, Klaus: *See*—
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Novakovic, Mario; and Abend, Phillip G., to Finetex, Inc. Surfactant compositions. 4,696,767, Cl. 252-557.000.
Novoselsky, Boris. Power rake. 4,696,348, Cl. 172-102.000.
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Nozue, Yoshihiro, to Fujitsu Limited. Error monitor circuit. 4,697,265, Cl. 371-5.000.
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Tsushima, Noriyuki; and Nakajima, Hirokazu, 4,696,581, Cl. 384-565.000.
Null, Larry G.: *See*—
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Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.
Numata, Tatsuo; Hatanaka, Masataka; Watanabe, Junichi; Ikai, Takasi; Nawamaki, Tsutomu; and Hattori, Kenji, to Nissan Chemical Industries Ltd. Pyridine derivatives and their herbicidal compositions. 4,696,694, Cl. 71-86.000.
Nutt, Wendell G.: *See*—
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N.V. Verenigde Energiebedrijven Van Het Scheldeland Mechelseteenweg: *See*—
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Obayashi, Tsutomo; Watanabe, Shinobu; and Ino, Kazuhide, to Hiraoka & Co., Ltd. Process for preparation of water-proof sheets. 4,696,830, Cl. 427-41.000.
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Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; Morita, Mikio; and Kamohara, Hisato, to Kabushiki Kaisha Toshiba. Magnetic core and preparation thereof. 4,696,725, Cl. 252-62.540.
Ochsner, Rolf H.; and Everett, Charles J., to Robertshaw Controls Company. Differential pressure operated electrical switch construction and method of making the same. 4,697,054, Cl. 200-82.00R.
Ockert, Carl E.: *See*—
Claytor, Thomas N.; Ockert, Carl E.; and Randall, Richard, 4,696,191, Cl. 73-600.000.
Oda, Hajime: *See*—
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Oda, Minoru; and Oba, Kunio, to Mitsubishi Denki Kabushiki Kaisha. Nuclear reactor power meter. 4,696,789, Cl. 376-254.000.
Oddou, Jacques: *See*—
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Odojewski, Stephen S.: *See*—
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Ogura, Setsuo: *See*—
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Ohara, Yuji, to Fuji Photo Film Co., Ltd. Laser apparatus. 4,697,269, Cl. 372-34.000.
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Matsui, Katsumasa; Ohba, Masahiro; Kakehi, Tohru; and Kawai, Takayoshi, 4,696,167, Cl. 62-180.000.
Ohio State University Research Foundation: *See*—
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Ohmori, Toshiaki: *See*—
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Ohnishi, Michikazu; and Tani, Nobutaka, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Method and apparatus for treating blood constituents. 4,696,670, Cl. 604-49.000.

Ohno, Satoru; and Shimada, Yasuhisa, to NEC Corporation. Precipitation loss compensation and disablement for avoidance of satellite transponder overloading. 4,697,187, Cl. 342-358.000.

Ohno, Shigeru: *See*—
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Ohtani, Takayuki; Isobe, Mitsuo; Aono, Akira; and Urakawa, Nobuaki, to Kabushiki Kaisha Toshiba. Current-mirror type sense amplifier. 4,697,112, Cl. 307-530.000.

Ohtani, Teruo; Tamura, Toshihisa; Ikeda, Yuji; Araikawa, Mutsuya; and Kywata, Kazuyoshi, to Kawasaki Steel Corporation. Apparatus for forming unevenness on an outer surface of a synthetic resin-coated steel pipe. 4,696,635, Cl. 425-330.000.

Oka, Masahiko; Ueta, Yutaka; Kano, Hideo; Tomoda, Masayasu; and Kawachi, Shoji, to Daikin Industries, Ltd. Fluorine-containing elastomeric copolymer. 4,696,989, Cl. 526-254.000.

Oka, Syotaro; Tahara, Shu; and Kobayashi, Junya, to Shimadzu Corporation. Moisture sensor. 4,696,796, Cl. 422-88.000.

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Okabe, Takahiro; Hayashi, Makoto; Morisuye, Katuhiro; Watanabe, Tomoyuki; Washio, Katsuyoshi; Ogura, Setsuo; Furihata, Makoto; and Kondo, Shizuo, to Hitachi Microcomputer Engineering Co., Ltd.; and Hitachi, Ltd. Bipolar logic circuit having two multi-emitter transistors with an emitter of one connected to the collector of the other to prevent saturation. 4,697,102, Cl. 307-454.000.

Okada, Yoshio; Ahiko, Nobuo; and Igarashi, Yuriko, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pressure-sensitive recording material. 4,696,856, Cl. 428-321.500.

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Okajima, Yoshinori, to Fujitsu Limited. Two stage decoder circuit using threshold logic to decode high-order bits and diode-matrix logic to decode low-order bits. 4,697,104, Cl. 307-463.000.

Okamura, Kiyohito; Hasegawa, Yoshio; Kuroo, Yoshiyasu; and Ugaji, Masana, to Sony Corporation; and Foundation: The Research Institute for Special Inorganic Materials, The. Silicon carbide-carbon composite molded product and process for manufacturing the same. 4,696,827, Cl. 427-36.000.

Okaniwa, Hiroshi; Nakatani, Kenji; and Sato, Tetsuo, to Teijin Limited. Integrated solar cells. 4,697,041, Cl. 136-244.000.

Okano, Hiroshi: *See*—
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O'Keeffe, Michael J.; Graba, James M.; and Noyes, George I., to Storage Technology Corporation. Sync pattern encoding system for data sectors written on a storage medium. 4,697,167, Cl. 340-347.0DD.

Okino, Susumu: *See*—
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Shinoda, Naoharu; Tatani, Atsushi; Onizuka, Masakazu; Okino, Susumu; and Shimizu, Taku, 4,696,805, Cl. 423-242.000.

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Okuda, Yaeko: *See*—
Ooka, Masataka; Okuda, Yaeko; and Kunugiza, Motoyasu, 4,696,975, Cl. 525-113.000.

Okuno, Shigeru; Torisawa, Yoshihiro; Endo, Mitsuharu; Nakayama, Tetsuroh; Shimosato, Masashi; and Fukushima, Takafumi, to Tokyo Electric Co., Ltd. Ink-dot printer. 4,696,589, Cl. 400-119.000.

Okutu, Toshimitu: *See*—
Miyoshi, Takahito; Aoki, Nobuo; Yoneyama, Takashi; Kasuga, Akira; Okutu, Toshimitu; Fujiyama, Masaaki; and Okuzawa, Yasutoshi, 4,696,859, Cl. 428-323.000.

Okuyama, Kousuke: *See*—
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Okuyama, Toru: *See*—
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Okuzawa, Yasutoshi: *See*—
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Oleck, Stephen M.: *See*—
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Olego, Diego J.: *See*—
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Olin Corporation: *See*—
Pryor, Michael J., 4,696,851, Cl. 428-210.000.

Oliver, Patrick R., to Bendix Limited. Pipe fitting assembly. 4,696,495, Cl. 285-86.000.

Olschewski, Armin; Brandenstein, Manfred; Hetterich, Hermann; and Kunkel, Heinrich, to SKF GmbH, Schweinfurt. Method for making machine parts and machine parts produced thereby. 4,696,083, Cl. 29-148.40C.

Olympus Corporation: *See*—
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Olympus Optical Co., Ltd.: *See*—
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Omichi, Kaoru: *See*—
Ikenaka, Tokuji; and Omichi, Kaoru, 4,697,006, Cl. 536-17.200.

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Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, 4,696,671, Cl. 604-67.000.

Omron Tateisi Electronics Co.: *See*—
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Ono, Akira, to Kabushiki Kaisha Toshiba. Surface inspection apparatus. 4,696,572, Cl. 356-348.000.

Ono, Naohiko: *See*—
Yamawaki, Ichiro; Ogawa, Kazuo; Ono, Naohiko; Honna, Takaji; Nagayama, Sekio; and Yasumoto, Mitsugi, 4,696,929, Cl. 514-253.000.

Ono, Naoya: *See*—
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Kato, Yasuo; Ono, Tetsuo; Watanabe, Yoshio; Murayama, Seiichi; Mikoshiba, Shigeo; and Matsuno, Hiromitsu, 4,697,121, Cl. 313-595.000.

Ooka, Masataka; Okuda, Yaeko; and Kunugiza, Motoyasu, to Dainippon Ink and Chemicals, Inc. Room temperature-curable resin composition. 4,696,975, Cl. 525-113.000.

Oosaki, Keiji: *See*—
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Clark, Brian C.; and Jines, Michael D., 4,696,361, Cl. 180-68.400.
Owen, Murl, to Lalos & Keegan. Method and apparatus for examining earth formations. 4,696,903, Cl. 436-28.000.
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Weaver, Edward A., 4,696,909, Cl. 501-75.000.
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Matsuura, Kotaro; and Oyamada, Kenji, 4,697,217, Cl. 360-125.000.
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Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Pallos, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.
Palmer, Darrel, to Ballard Medical Products. Aspirating/ventilating apparatus. 4,696,296, Cl. 128-207.160.
Panessidi, Joseph. Animal shelter. 4,696,260, Cl. 119-19.000.
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Ellerbe, Gilbert B., III; and Parrish, Donald B., 4,696,976, Cl. 525-126.000.
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Schwartz, Willis T.; and Pawlak, Joseph A., 4,697,023, Cl. 549-241.000.
Paxton, Ronald B., to Morton Thiokol, Inc. High propellant mass fraction highly stress relieved end-burning grain structure. 4,696,233, Cl. 102-287.000.
Pecak, Matthew L.: *See—*
Hofer, Dean A.; Carlson, Daniel J.; and Pecak, Matthew L., 4,697,192, Cl. 343-895.000.
Peddy, John T.: *See—*
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Rasmussen, Ivar; and Pedersen, Poul H. H., 4,696,161, Cl. 60-384.000.
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Penney, Carl M., to General Electric Company. Precision remote location of a movable point employing light interference fringes. 4,696,574, Cl. 356-375.000.
Pentith, Gerald R. O., to Fletcher Sutcliffe Wild Ltd. Conveying apparatus. 4,696,391, Cl. 198-833.000.
Performance Controls, Inc.: *See—*
Goff, Jerry K.; and Chizever, Gary E., 4,697,125, Cl. 318-254.000.
Performance Industries, Inc.: *See—*
Boyesen, Eyvind, 4,696,263, Cl. 123-65.00V.
Pergandis, Grigorios. Rechargeable battery powered toy. 4,697,133, Cl. 320-2.000.
Perigne, Jerome: *See—*
Barbier, Gerard Y. G.; Leboure, Gerald J. P. B.; Desaulty, Michel A. A.; Martinez, Rodolphe; and Perigne, Jerome, 4,696,157, Cl. 60-39.230.
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Wu, Frederick Y., 4,697,087, Cl. 250-548.000.
Perlos Oy: *See—*
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Perry, Charles D., III. Eyeglass retainer. 4,696,556, Cl. 351-157.000.
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Lindae, Gerhard; Perthus, Peter; and Rein, Heinz, 4,697,225, Cl. 362-61.000.
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Boulton, David A.; Kopka, Ihor E.; Moore, Vernon L.; and Pessolano, Arsenio A., 4,697,012, Cl. 544-124.000.
Peter von Berg Extrakorporale Systems-Medizintechnik GmbH: *See—*
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Geary, Joseph M.; and Peterson, Phillip R., 4,696,569, Cl. 356-124.000.
Petit, Daniel: *See—*
Walter, Jean-Jacques; Petit, Daniel; Marzocca, Joseph; Amalric, Jean; and Bernard, Georges, 4,697,055, Cl. 200-148.00B.
Petocz, Lujza: *See—*
Messmer, Andras; Batori, Sandor; Hajos, Gyorgy; Benko, Pal; Pallos, Laszlo ; Petocz, Lujza; Grasser Katalin; and Kosoczky, Ibolya, 4,697,013, Cl. 544-183.000.
Petracca, Victor G.: *See—*
Ward, Thomas A.; Petracca, Victor G.; and Figore, Timothy, 4,696,864, Cl. 428-413.000.
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Roggendorf, Peter; and Buchmann, Rainer, 4,697,092, Cl. 307-10.00R.
Petronko, Dennis A. Heat foam insulation jacket. 4,696,324, Cl. 137-375.000.
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Epstein, Paul; Petschek, Harry; LaWhite, Eric; Strohl, Clair; Coyne, Henry; Kaleskas, Edward; and Adaniya, George, 4,696,671, Cl. 604-67.000.
Pettit, Harold W., Jr; Davis, Charles G.; and Walden, Frederick C., to United Technologies Corporation. Multiple port plasma spray apparatus and method for providing sprayed abradable coatings. 4,696,855, Cl. 428-312.800.
Petty, Bruce R.: *See—*
Butts, Gene A.; Kelley, Charles D.; Garsee, Henry A.; Petty, Bruce R.; and Pauley, James L., 4,697,236, Cl. 364-416.000.
Petzoldt, Karl, to Schering Aktiengesellschaft. Indanyl derivatives and process for their preparation. 4,696,948, Cl. 514-605.000.
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Pfeifer, Josef, to Ciba-Geigy Corporation. Processes for preparing protective coatings and relief structures. 4,696,890, Cl. 430-325.000.
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Philip Morris Incorporated: *See—*
Kallianos, Andrew G.; and Kounnas, Christopher N., 4,696,314, Cl. 131-336.000.
Turano, Louis R.; Callaham, William T.; Sherwood, John F.; and Thatcher, Richard E., 4,696,312, Cl. 131-109.100.
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Phillips Petroleum Company: *See—*
Gentry, Cecil C., 4,696,734, Cl. 208-407.000.
Rahlwes, William C., 4,696,741, Cl. 210-232.000.
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Piazza, Michael P.: *See—*
Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., 4,696,603, Cl. 405-227.000.
Piccirilli, Robert: *See—*
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Pichot, Jacky; and Oddou, Jacques, to Electricite de France. Method of transforming a pre-existing heat installation, and control device for implementing the method. 4,696,427, Cl. 236-1.00E.

Pinkney, James, to South Park Sales & Mfg., Inc. Loose leaf binder lift lock. 4,696,595, Cl. 402-54.000.

Pinto, Alwyn, to Imperial Chemical Industries PLC. Electricity production. 4,696,871, Cl. 429-17.000.

Pioneer Electronic Corporation: *See*—
Tokumo, Akio; Takagi, Kazunori; and Mori, Shuichi, 4,696,370, Cl. 181-141.000.

Pirelli Transmissioni Industriali S.p.A.: *See*—
Macchiarulo, Vincenzo; and Marcelli, Ezio, 4,696,665, Cl. 474-153.000.

Pischinger, Franz, to FEV Forschungsgesellschaft fur Energietechnik und Verbrennungsmotoren mbH. Combustion process for internal combustion engine. 4,696,270, Cl. 123-274.000.

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Piteau, Marc: *See*—
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Suh, John T.; Piwinski, John J.; Jones, Howard; and Neiss, Edward S., 4,696,939, Cl. 514-361.000.

Pizzo, Joseph A.: *See*—
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Pleines, Peter; and Wolf, Erich, to Farco-Pharma GmbH. Process for collecting fragments which are obtained on shattering stones in body cavities of living humans and other mammals. 4,696,297, Cl. 128-303.100.

Plescia, Ralphael. Nut for stringed instruments. 4,696,219, Cl. 84-314.00N.

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Beaufoy, Raymond, 4,697,263, Cl. 370-85.000.

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Cael, John J., 4,696,876, Cl. 430-1.000.

Pollak, Raimund: *See*—
Ettischer, Helmut; Ebner, Arno; Munz, Rolf; and Pollak, Raimund, 4,696,615, Cl. 414-114.000.

Pollock, Richard A.: *See*—
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Bertrand, Jean-Jacques, 4,697,165, Cl. 340-540.000.

Porath, Jerker. Sulfone activated thioether adsorbents for the separation of proteins and the like. 4,696,980, Cl. 525-326.100.

Powers, Ronald J. Cosmetic pescil having advanceable cosmetic mass. 4,696,594, Cl. 401-65.000.

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Chang, Wen-Hsuan; Chau, Michael M.; and Piccirilli, Robert, 4,696,959, Cl. 524-91.000.
Gemert, Barry V., 4,696,695, Cl. 71-92.000.
Lawhon, Robert A.; Heithoff, Robert B.; and Gonzalez, Wayne H., 4,696,691, Cl. 65-27.000.
Ward, Thomas A.; Petracca, Victor G.; and Figore, Timothy, 4,696,864, Cl. 428-413.000.

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le Chatelier, Robert; Sinic, Andre ; and Diefenbach, Jean-Jacques, 4,696,334, Cl. 152-417.000.

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Vandame, Bertrand, 4,696,530, Cl. 439-266.000.

Press Technology Corporation: *See*—
Zandel, Adam, 4,696,180, Cl. 72-456.000.

Priam Corporation: *See*—
Cloke, Robert L., 4,697,098, Cl. 307-354.000.

Price, John G.: *See*—
Esch, Friedrich D.; and Price, John G., 4,696,146, Cl. 53-529.000.

Pridham, Roger G., to Raytheon Company. System and method for measuring ice thickness. 4,697,254, Cl. 367-92.000.

Priebe, Waldemar: *See*—
Swenton, John S.; Morrow, Gary W.; and Priebe, Waldemar, 4,697,005, Cl. 536-6.400.

Pritchard, James R.; and Regelman, Dale F., to Dow Chemical Company, The. Thermally stable and high impact resistant structural polyurethane foam. 4,696,954, Cl. 521-167.000.

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McCullough, Michael J.; McKihhen, Gary E.; and Skidmore, John E., 4,696,840, Cl. 220-462.000.
Muckenfuhs, Delmar R.; and Van Coney, Robert H., 4,696,416, Cl. 222-109.000.

Prouteau, Philippe: *See*—
Laville, Bernard; and Prouteau, Philippe, 4,696,511, Cl. 296-216.000.

Prussas, Herbert: *See*—
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Pryor, Michael J., to Olin Corporation. Hybrid and multi-layer circuitry. 4,696,851, Cl. 428-210.000.

Pullman Rail Leasing Corporation: *See*—
Miller, Roy W., 4,696,088, Cl. 29-401.100.

Pullman Rail Leasing Incorporated: *See*—
Miller, Roy W., 4,696,237, Cl. 105-248.000.

Pum, Reinhard: *See*—
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.

Pummell, Ivan K.: *See*—
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Quadic Systems, Inc.: *See*—
Ferris, David A.; and DeSimone, Daniel J., 4,697,103, Cl. 307-456.000.

Quan, Peter M.: *See*—
Devonald, David P.; Nelson, Anthony J.; Quan, Peter M.; and Stewart, David, 4,696,801, Cl. 423-24.000.

Quanex Corporation: *See*—
Church, Kristy L., 4,696,498, Cl. 285-334.000.

Quate, Calvin F.; and Khuri-Yakub, Butrus T., to Xerox Corporation. Nozzleless liquid droplet ejectors. 4,697,195, Cl. 346-140.00R.

Quint, David W.: *See*—
Monnig, Kenneth A.; and Quint, David W., 4,696,833, Cl. 437-225.000.

Rabindran, K. George: *See*—
Zemke, Edward H., deceased; Vandersyde, Gary L.; Rabindran, K. George; and Guenther, Kenneth L., 4,697,246, Cl. 364-563.000.

Raccah, Paul M.: *See*—
Schachter, Rozalie; Viscogliosi, Marcello; Bunz, Lewis A.; Olego, Diego J.; Serreze, Harvey B.; and Raccah, Paul M., 4,696,828, Cl. 427-38.000.

Rach, Heinz-Dieter; and Frerichs, Udo, to Continental Gummi-Werke Aktiengesellschaft. Rim for a pneumatic vehicle tire. 4,696,333, Cl. 152-379.300.

Radiall Industrie: *See*—
Despouys, Jean-Bernard, 4,696,538, Cl. 350-96.200.

Rahiwes, William C., to Phillips Petroleum Company. Vortex breaker for use in a liquid-liquid separator or the like. 4,696,741, Cl. 210-232.000.

Rakoczynski, Randolph W.; Odojewski, Stephen S.; and Rolfe, John I., to Waste Resource Associates, Inc. Secure landfill and method of operating a landfill for hazardous waste. 4,696,599, Cl. 405-129.000.

Raleigh, William J.: *See*—
Thimineur, Raymond J.; and Raleigh, William J., 4,696,969, Cl. 524-762.000.

Ranallo, Frank N.: *See*—
Zarnstorff, William C.; and Ranallo, Frank N., 4,697,280, Cl. 378-207.000.

Randall, Richard: *See*—
Claytor, Thomas N.; Ockert, Carl E.; and Randall, Richard, 4,696,191, Cl. 73-600.000.

Randall, Russel R., to Western Atlas International, Inc. Method for quality control of counting logs. 4,697,078, Cl. 250-256.000.

Randke, Peter T.: *See*—
Graf, Hans-Juergen; and Randke, Peter T., 4,696,411, Cl. 220-281.000.

Raphael, Barbara C.: *See*—
Leusner, Steven J.; Raphael, Barbara C.; and Swanhart, William G., Jr., 4,696,826, Cl. 426-565.000.

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Woods, Donald R.; and Woods, Helga S., 4,696,168, Cl. 62-200.000.

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Rasmussen, Russell G.: *See*—
Welch, Bennie R.; Rasmussen, Russell G.; and Disko, Harry, 4,696,654, Cl. 446-268.000.

Ratcliff, Perry A. Method and composition for prevention and treatment of oral disease. 4,696,811, Cl. 424-53.000.

Rathke, Jorg: *See*—
Bauer, Anton E.; Billmann, Gerhard; Rathke, Jorg; Schimanek, Hans-Joachim; Schrott, Georg W.; and Wodok, Hans, 4,696,537, Cl. 350-96.200.

Ratzel, Dieter: *See*—
Strobel, Bernhard; and Ratzel, Dieter, 4,697,148, Cl. 324-309.000.

Raudman, Charles J.; and Smith, Philip E. Spill collector assembly for liquid storage vessels. 4,696,330, Cl. 141-86.000.

Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Compositions stabilized with ethers of di- and tri-substituted hydroxylamines. 4,696,964, Cl. 524-236.000.

Rayburn, Walter. Casting float with line stop. 4,696,125, Cl. 43-43.140.

Raychem Corp.: *See*—
Mattis, John S., 4,696,532, Cl. 439-863.000.
Vidakovits, Lajos J., 4,696,841, Cl. 428-36.000.

Rayovac Corporation: *See*—
Harmon, Charles H.; Ward, Thomas F.; and Zimmermann, Robert W., 4,696,402, Cl. 206-602.000.

Raytheon Company: *See*—
Conrad, George M.; and Smalley, Kenneth M., 4,697,096, Cl. 307-246.000.
Lind, Earl R.; and Franklin, Ronald A., 4,697,253, Cl. 367-12.000.
Pridham, Roger G., 4,697,254, Cl. 367-92.000.

RCA Corporation: *See*—
Alig, Roger C.; Bloom, Stanley; and Hockings, Eric F., 4,697,120, Cl. 313-412.000.
Balaban, Alvin R.; and Steckler, Steven A., 4,697,211, Cl. 358-153.000.
Dresner, Joseph, 4,697,197, Cl. 357-4.000.
Magee, Charles W.; and Honig, Richard E., 4,697,085, Cl. 250-426.000.

Sechi, Franco N.; and Kalokitis, David, 4,697,159, Cl. 333-24.00C.
Redicon Corporation: *See*—
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Reeder, James A.; and Reeder, Joanne E. Portable, foldable replica of a facade of commercial establishments. 4,696,652, Cl. 446-75.000.
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Reeder, James A.; and Reeder, Joanne E., 4,696,652, Cl. 446-75.000.
Reedy, Ronald E.: *See*—
Albares, Donald J.; and Reedy, Ronald E., 4,696,536, Cl. 350-96.190.
Reese, James R.; and Yelich, William, to Cla-Val Company. Air release and vacuum breaker valve system. 4,696,321, Cl. 137-202.000.
Regelman, Dale F.: *See*—
Pritchard, James R.; and Regelman, Dale F., 4,696,954, Cl. 521-167.000.
Regipa, Robert, to Centre National d'Etudes Spatiales (C.N.E.S.). Device for coupling a balloon envelope with an element external to the envelope. 4,696,444, Cl. 244-127.000.
Rehlander, Weber. Forward-reverse belt transmission. 4,696,661, Cl. 474-5.000.
Reiffen, Manfred: *See*—
Hauel, Norbert; Austel, Volkhard; Heider, Joachim; Reiffen, Manfred; and Diederen, Willi, 4,696,931, Cl. 514-261.000.
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Lindae, Gerhard; Perthus, Peter; and Rein, Heinz, 4,697,225, Cl. 362-61.000.
Renfro, James G., to Hughes Tool Company. Torque wrench. 4,696,206, Cl. 81-57.340.
Rengo Co., Ltd.: *See*—
Tokuno, Masateru; Sawada, Tetsuya; and Mori, Yasuharu, 4,696,212, Cl. 83-343.000.
Renker, Hansjoerg and Abegglen, Martin, to Fritz Studer AG. Polymer concrete ar[illegible]nd process for manufacturing same. 4,696,839, Cl. 428-15.000.
Renold, Inc.: *See*—
Beehler, David E.; Drake, Timothy E.; and Hawk, Timothy E., 4,696,357, Cl. 177-145.000.
Research Corporation: *See*—
DesMarteau, Darryl D., 4,697,011, Cl. 540-544.000.
Resman, John B.: *See*—
Stich, Michael C.; Resman, John B.; Ottesen, Hjalmar H.; and Anderson, Todd B., 4,697,127, Cl. 318-561.000.
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Glomeau, J. Robert, 4,696,163, Cl. 60-476.000.
Reyner, Franklin C. Contraceptive device and related method. 4,696,294, Cl. 128-131.000.
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Rhee, Sang S.: *See*—
Weber, Otto K.; and Rhee, Sang S., 4,697,077, Cl. 250-231.0SE.
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Kaltmann, Hans-Joachim; and Schaper, Hermann, 4,696,234, Cl. 102-308.000.
Rhodes, Harold B., Jr. Spillage prevention. 4,696,328, Cl. 141-1.000.
Rhodes, James A.: *See*—
Wren, Michael; Lantz, Paul W.; Acock, George W., Jr.; and Rhodes, James A., 4,696,133, Cl. 52-80.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Robin, Jean, 4,697,014, Cl. 544-193.000.
Rice, George. Apparatus for locating the outline of an accessory in dry wall or a decorative panel. 4,696,113, Cl. 33-562.000.
Rice, Richard D., Jr. Centrifuge machine and rotor. 4,696,666, Cl. 494-16.000.
Richardson, Eugene M.; Brehm, Norbert O.; and Null, Larry G., to LTV Energy Products Company. Brake system for drawworks. 4,696,377, Cl. 188-170.000.
Richardson, John C.; and Salame, Morris, to Monsanto Company. Hollow copolyamide article. 4,696,865, Cl. 428-474.400.
Richter Gedeon Vegyeszeti Gyar RT: *See*—
Megyeri, Gabor; Keve, Tibor; Galambos, Janos; Kovacs, Lajos, Jr.; Stefko, Bela; Bogsch, Erik; and Trischler, Ferenc, 4,697,017, Cl. 544-346.000.
Richwood Industries, Inc.: *See*—
Stoll, Donald L., 4,696,388, Cl. 198-493.000.
Ricoh Co., Ltd.: *See*—
Abe, Michiharu; Umehara, Masaakira; Sato, Tsutomu; Oba, Hideaki; Ueda, Yutaka; and Kunikane, Makoto, 4,696,892, Cl. 430-495.000.
Kurotaka, Sigeo; and Tukano, Moriyosi, 4,696,418, Cl. 222-167.000.
Nakazato, Yukitaka; Hashimoto, Kenji; and Taruki, Takashi, 4,696,463, Cl. 271-176.000.
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Tomizuka, Mitsuo, 4,696,557, Cl. 353-66.000.
Yano, Hidetoshi; Seimiya, Ryubun; Tarumi, Noriyoshi; Demizu, Hiromi; and Obu, Makoto, 4,696,255, Cl. 118-653.000.
Ringle, Richard P.: *See*—
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Risbet, Marie P.: *See*—
Fonfria, Robert; Risbet, Marie P.; and Zattara, Jean L., 4,696,082, Cl. 29-25.420.
Risley, Charles N. Material separating surface. 4,696,738, Cl. 209-352.000.
Riviere, Guy; and Luczak, Jean P. Traction type press. 4,696,637, Cl. 425-589.000.
Rivoli, Mark S., to Northrop Corporation. Substrate container. 4,696,395, Cl. 206-334.000.
Robert Bosch GmbH: *See*—
Flaig, Ulrich; and Sieber, Albrecht, 4,696,276, Cl. 123-478.000.
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Roberts, Karl A.: *See*—
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Buckshaw, Thomas M.; and Llewellyn, David T., 4,696,204, Cl. 74-567.000.
Fowler, Daniel L., 4,697,057, Cl. 219-10.55B.
Ochsner, Rolf H.; and Everett, Charles J., 4,697,054, Cl. 200-82.00R.
Robertson, Brian W.; and Phillips, Gareth T., to Shell Internationale Research Maatschappij B.V.; and Gist Brocades N.V. Immobilization of microorganisms on a plastic carrier. 4,696,901, Cl. 435-180.000.
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Cox, Harold S., 4,696,950, Cl. 521-57.000.
Rock, Robert G., to United States of America, Navy. Velocity discrimination radar. 4,697,186, Cl. 342-189.000.
Rockwell International Corporation: *See*—
Maus, Louis; Witucki, Edward F.; and Warren, Leslie F., 4,696,835, Cl. 427-121.000.
Walker, John A.; Witucki, Edward F.; and Warren, Leslie F., 4,697,001, Cl. 528-423.000.
Witucki, Edward F.; and Warren, Leslie F., 4,697,000, Cl. 528-423.000.
Roggendorf, Peter; and Buchmann, Rainer, to Petri AG. Control system for electrically operated components of an automotive vehicle. 4,697,092, Cl. 307-10.00R.
Roggendorff, Martin, to Kloeckner-Humboldt-Deutz AG. Air-cooled internal combustion engine. 4,696,262, Cl. 123-41.690.
Rogic, Milorad M.: *See*—
Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,696,693, Cl. 71-28.000.
Rohm GmbH: *See*—
Ude, Werner; Knebel, Joachim; and Schroeder, Guenter, 4,696,993, Cl. 528-167.000.
Rohm and Haas Company: *See*—
Le, Dat P., 4,696,938, Cl. 514-343.000.
Rohr, Gustav; and Nohl, Gerd, to Frankl & Kirchner GmbH. Device for detecting an overlapping edge of material on a sewing machine. 4,696,246, Cl. 112-272.000.
Roland, Robert D.: *See*—
Knapp, Alfons; Roland, Robert D.; and Hutto, Joe D., 4,696,322, Cl. 137-218.000.
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Rakoczynski, Randolph W.; Odojewski, Stephen S.; and Rolfe, John I., 4,696,599, Cl. 405-129.000.
Rolls-Royce: *See*—
Hamblett, Martin; and Livsey, Duncan J., 4,696,621, Cl. 415-191.000.
Rolls-Royce plc: *See*—
Stewart, Peter A. E.; Hawkesworth, Michael R.; and Witcomb, Roger C., 4,697,079, Cl. 250-303.000.
Roloff, Achim; and Gschwend, Heinz W., to Ciba-Geigy Corporation. Intermediates for the preparation of a carboxylic acid. 4,697,016, Cl. 544-344.000.
Roloff, Helmut, to Himly, Holscher GmbH & Co. Method and device for preheating raw materials for glass production, particularly a cullet mixture. 4,696,690, Cl. 65-27.000.
Romano, Antonino. Pneumatic action accessory holder specifically for sewing machines. 4,696,243, Cl. 112-257.000.
Romer, Michael: *See*—
Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, 4,696,549, Cl. 350-350.00R.
Romero, Jorge E.: *See*—
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Ronk Electrical Industries, Inc.: *See*—
Ronk, Leroy B.; and Hertz, Claude M., 4,697,132, Cl. 318-795.000.
Ronk, Leroy B.; and Hertz, Claude M., to Ronk Electrical Industries, Inc. Reduction of voltage drop in power distribution systems and of loss of motor torque. 4,697,132, Cl. 318-795.000.
Roos, Hartog J.; and Schilling, Edward F., to General Electric Company. X-ray imaging system calibration using projection means. 4,697,075, Cl. 250-213.0VT.
Rosen, Marvin E.: *See*—
Sampson, Mark E.; and Rosen, Marvin E., 4,696,244, Cl. 112-262.100.
Rosenquist, Niles R., to General Electric Company. Cyclic carbonate oligomer composition. 4,696,997, Cl. 528-271.000.
Ross, Colin F.: *See*—
McCann, Denis J.; and Ross, Colin F., 4,696,521, Cl. 303-92.000.

Rosset, Roger; and Mayeur, Jacques, to SEB S.A. Steam-generating device and a cooking oven equipped with said device. 4,697,067, Cl. 219-401.000.

Rossier, Jean-Robert: *See*—
Bentzen, Craig L.; Guyon-Gellin, Yves; Kalathakis, Kyriacos; Phan, Hieu T.; Nguyen Mong, Lan; Niesor, Eric; and Rossier, Jean-Robert, 4,696,920, Cl. 514-89.000.

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Tolino, Ralph W.; King, William E.; Blickenderfer, Jack L.; and Roth, Charles H., Jr., 4,696,784, Cl. 376-245.000.

Rowe, Edward A., Jr., to Occidental Electrochemical Corporation. Perchloroethylene dielectric fluid containing aliphatic hydrocarbons. 4,697,043, Cl. 174-17.0LF.

Royzman, Semyon E., to Blaw Knox Corporation. Method and plant for fully continuous production of steel strip from ore. 4,696,458, Cl. 266-212.000.

Ruaud, Xavier, to La Telemecanique Electrique. Emergency switching apparatus. 4,697,052, Cl. 200-43.070.

Rudolph, Georg, to Wandel u. Goltermann GmbH & Co. Digitally controlled variable frequency synthesizer. 4,697,156, Cl. 331-1.00A.

Ruetz, Georg; and Giesselmann, Jurgen, to MTU Friedrichshafen GmbH. Fluid flow machine. 4,696,620, Cl. 415-164.000.

Ruger, James; and Welz, Wolfgang, to Eltro GmbH. Radiation detection method. 4,696,567, Cl. 356-28.000.

Ruhrkohle Aktiengesellschaft: *See*—
Wolowski, Eckard; Mirtsch, Frank; and Dybus, Herbert, 4,696,735, Cl. 208-408.000.

Ruhter, Martin L.; Brimeyer, Dennis A.; and Stubben, David W., to Deere & Company. Motor grader with saddle mounted to transverse pin on main frame. 4,696,350, Cl. 172-793.000.

Ruhter, Martin L., to Deere & Company. Rear steer angle indicator for articulating vehicle. 4,696,486, Cl. 280-400.000.

Rupprecht, Eckhard: *See*—
Schepky, Gottfried; Brickl, Rolf; Rupprecht, Eckhard; and Greischel, Andreas, 4,696,815, Cl. 424-80.000.

Rupprecht, Georg; and Hassel, David R., to Rupprecht & Patashnick Co., Inc. Decoupling suspension system for an oscillating element microbalance. 4,696,181, Cl. 73-580.000.

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Rupprecht, Georg; and Hassel, David R., 4,696,181, Cl. 73-580.000.

Rush, Lynn: *See*—
Walker, Don W.; and Rush, Lynn, 4,696,110, Cl. 33-137.00R.

Russ, Roger A.; and Hennen, John J., to Deere & Company. Forage harvester blower. 4,696,432, Cl. 241-101.700.

Russe, Meinhard W.; Bolze, Rudolf; and Koch, Friedhelm, to Degussa Aktiengesellschaft. Material for improving the fertility of mammals and process for its production. 4,696,914, Cl. 514-19.000.

Russell, Lionel V. F., to W. Vinten Limited. Equipment mounting mechanism. 4,696,596, Cl. 403-321.000.

Rusznyak, Andreas, to Motorola, Inc. CMOS power-on detection circuit. 4,697,097, Cl. 307-296.00R.

Ruynon, James R.: *See*—
Danner, Bernard; and Ruynon, James R., 4,696,962, Cl. 524-140.000.

Ryan, John L. High capacity shear fastener. 4,696,423, Cl. 227-55.000.

Ryan, Michael K. Farrier's tool. 4,696,346, Cl. 168-45.000.

Ryglicki, Roman: *See*—
Grochal, Tadeusz; Ryglicki, Roman; and Wierzchowski, Wojciech, 4,696,337, Cl. 164-150.000.

Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,696,858, Cl. 428-323.000.

S. C. Johnson & Son, Inc.: *See*—
Grothaus, Roger H.; and Hildebrandt, Donald W., 4,696,126, Cl. 43-112.000.

S.I.E., Inc.: *See*—
Anderson, Richard V.; and Carnes, Wendall D., 4,696,343, Cl. 166-164.000.

Sacks, William: *See*—
Sibilia, John P.; Kotliar, Abraham M.; Murthy, Narasimhaiah S.; and Sacks, William, 4,696,857, Cl. 428-323.000.

Sagawa, Takayoshi: *See*—
Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.

Saha, Sanjiv, to BICC Public Limited Company. Apparatus for extracting light from the core of an optical fibre through the cladding and buffer coating thereof and its use in optical fibre splicing. 4,696,534, Cl. 350-96.150.

Saha, Sanjiv, to BICC Public Limited Company. Apparatus for injecting light through a buffer-coated optical fibre into the core thereof and its use in optical fibre splicing. 4,696,535, Cl. 350-96.150.

Saiko, Alfons: *See*—
Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alfons, 4,696,251, Cl. 114-346.000.

Saint Gobain Vitrage: *See*—
Degeilh, Robert, 4,696,971, Cl. 525-61.000.
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Saito, Noriaki: *See*—
Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.

Saito, Tadahiro; and Gotoh, Kunihiko, to Fujitsu Limited. Semiconductor integrated circuit having a test circuit for testing an internal circuit. 4,697,140, Cl. 324-73.00R.

Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, to Canon Kabushiki Kaisha. Member having light receiving layer with smoothly connected interfaces. 4,696,881, Cl. 430-57.000.

Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, to Canon Kabushiki Kaisha. Member having light receiving layer with smoothly interconnecting nonparallel interfaces. 4,696,882, Cl. 430-57.000.

Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, to Canon Kabushiki Kaisha. Member having light receiving layer with smoothly connected nonparallel interfaces and surface reflective layer. 4,696,883, Cl. 430-57.000.

Saitoh, Keishi; Kanai, Masahiro; Sueda, Tetsuo; Misumi, Teruo; Tsuezuki, Yoshio; and Ogawa, Kyosuke, to Canon Kabushiki Kaisha. Member having photosensitive layer with series of smoothly continuous non-parallel interfaces. 4,696,884, Cl. 430-58.000.

Sakaguchi, Isao; and Kawaide, Tatsuo, to Hitachi, Ltd. Method of orienting magnetic disc by magnetic field. 4,696,831, Cl. 427-48.000.

Sakaguchi, Takahiro: *See*—
Enami, Katsuya; Tsuyuguchi, Hiroshi; and Sakaguchi, Takahiro, 4,697,129, Cl. 318-696.000.

Sakai, Kunito; Matsuda, Sadamu; and Takahama, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device and manufacturing method therefor. 4,697,203, Cl. 357-72.000.

Sakaime, Zenichiro: *See*—
Kawai, Keiichi; Yasuda, Setsuo; and Sakaime, Zenichiro, 4,696,079, Cl. 17-33.000.

Sakata, Hirotsugu; Nagatomo, Shigemi; Hayano, Makoto; and Hatori, Mitsuo, to Kabushiki Kaisha Toshiba. Scroll compressor with a thrust reduction mechanism. 4,696,630, Cl. 418-55.000.

Saksena, Anil K.: *See*—
Green, Michael J.; and Saksena, Anil K., 4,696,946, Cl. 514-574.000.

Salame, Morris: *See*—
Richardson, John C.; and Salame, Morris, 4,696,865, Cl. 428-474.400.

Sampson, Karla: *See*—
Kao, Shui-Hsi; Kay, Allen I.; and Sampson, Karla, 4,696,814, Cl. 424-80.000.

Sampson, Mark E.; and Rosen, Marvin E., to Doboy Packaging Machinery, Inc. Thread chaining detector. 4,696,244, Cl. 112-262.100.

Samuels, Peter B. Hemostatic clip cartridge. 4,696,396, Cl. 206-339.000.

Sanden Corporation: *See*—
Tamura, Yasuji, 4,697,091, Cl. 290-45.000.

Sander, Eugene H.; and Cook, Douglas R., to Zumbro Enterprises, Inc. Hydroxypropylmethylcellulose. 4,696,762, Cl. 252-311.000.

Sandoz Ltd.: *See*—
Danner, Bernard; and Ruynon, James R., 4,696,962, Cl. 524-140.000.
Hearick, Clive A., 4,697,033, Cl. 558-233.000.

Sangamo Weston, Inc.: *See*—
Swanson, Scott C., 4,697,180, Cl. 340-870.020.
Swanson, Scott C., 4,697,181, Cl. 340-870.020.
Swanson, Scott C., 4,697,182, Cl. 340-870.020.

Sano, Yasuro: *See*—
Kato, Kenji; and Sano, Yasuro, 4,696,245, Cl. 112-264.100.

Sanofi: *See*—
Sebille, Bernard; Beuzard, Yves; and Demarne, Henri, 4,696,937, Cl. 514-314.000.

Sansho Seiyaku Co., Ltd.: *See*—
Higa, Yoshitaka, 4,696,813, Cl. 424-59.000.

Santini, Hugo A. A., to International Business Machines. Electroplating cell. 4,696,729, Cl. 204-224.00R.

Santo, Philip J. Deck for supporting a floatation sleep system bladder. 4,696,071, Cl. 5-451.000.

Sanyo Electric Co., Ltd.: *See*—
Ito, Kazuo; Kudo, Toshiyuki; and Hama, Ritsuo, 4,697,074, Cl. 250-211.00R.
Kawakami, Kiyotada, 4,697,176, Cl. 340-723.000.
Matsuura, Kotaro; and Oyamada, Kenji, 4,697,217, Cl. 360-125.000.

Saotome, Minoru: *See*—
Morimoto, Yutaka; Saotome, Minoru; and Komai, Atsushi, 4,696,760, Cl. 252-314.000.

Sasakawa, Hirotaka, to Casio Computer Co., Ltd. Tape loading device. 4,697,214, Cl. 360-85.000.

Sasaki, Torahiko; Sato, Kazuo; Ohkawa, Masahiro; Suzuki, Yoshihiro; Kubota, Masato; Nakao, Hatsuo; and Tange, Kyoichi, to Toyota Jidosha Kabushiki Kaisha. Solution circulation type metal-halogen battery. 4,696,870, Cl. 429-14.000.

Sasaki, Toshiharu: *See*—
Urata, Yoshihito; Tatekawa, Masaichiro; and Sasaki, Toshiharu, 4,696,562, Cl. 355-3.00R.

Sasaki, Toshihiko; Sunayama, Yooji; Yoshida, Isao; and Endo, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Ozone generating apparatus. 4,696,800, Cl. 422-186.180.

Sato, Kazuo: *See*—
Sasaki, Torahiko; Sato, Kazuo; Ohkawa, Masahiro; Suzuki, Yoshihiro; Kubota, Masato; Nakao, Hatsuo; and Tange, Kyoichi, 4,696,870, Cl. 429-14.000.

Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; Tsukase, Masaaki; and Kato, Masatoshi, to Fuji Photo Film Co., Ltd. Method for formation of an image comprising a heating step. 4,696,887, Cl. 430-203.000.

Sato, Kunihiko, to Toyota Jidosha Kabushiki Kaisha. Fuel injection control for internal combustion engine. 4,696,274, Cl. 123-440.000.

Sato, Take: *See*—
Shimomura, Kenji; Kouketsu, Shigeaki; Okuyama, Toru; and Sato, Take, 4,696,952, Cl. 521-107.000.

Sato, Tetsuo: *See*—
Okaniwa, Hiroshi; Nakatani, Kenji; and Sato, Tetsuo, 4,697,041, Cl. 136-244.000.

Sato, Tsutomu: *See*—
Abe, Michiharu; Umehara, Masaakira; Sato, Tsutomu; Oba, Hideaki; Ueda, Yutaka; and Kunikane, Makoto, 4,696,892, Cl. 430-495.000.

Sato, Yuji: *See*—
Yagasaki, Eriko; Kanda, Motoya; Mitsuyasu, Kiyoshi; and Sato, Yuji, 4,696,873, Cl. 429-59.000.

Satomura, Hiroshi: *See*—
Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, 4,697,196, Cl. 346-159.000.

Sauder, Karl, to Compat Aktiengesellschaft, Firma. Apparatus for pressing tubular parts. 4,696,085, Cl. 29-237.000.

Saupe, Martin; Dauernheim, Hans; and Markl, Maximillian, to Emda Fabrik Elektro-Medizinischer und Dentaler Apparate Georg Hartmann GmbH & Co. KG. Apparatus for removing plaque and stains from the surfaces of teeth. 4,696,645, Cl. 433-125.000.

Savary, Fernand: *See*—
Lesauliner, Guy; and Savary, Fernand, 4,696,783, Cl. 376-228.000.

Savonlahti, Jukka; Ekholm, Pertti; and Harjunmaa, Hannu, to Labsystems Oy. Valve device. 4,696,195, Cl. 73-864.840.

Sawada, Tetsuya: *See*—
Tokuno, Masateru; Sawada, Tetsuya; and Mori, Yasuharu, 4,696,212, Cl. 83-343.000.

Sawaguchi, Tatsue: *See*—
Nobukawa, Akira; Sawaguchi, Tatsue; and Kuroki, Yoshihiro, 4,696,513, Cl. 279-121.000.

Sawamoto, Mitsuo: *See*—
Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.

Sawyer, William H.: *See*—
Kara, Gerald F.; and Sawyer, William H., 4,697,245, Cl. 364-552.000.

Scamehorn, John F.: *See*—
Blytas, George C.; Grimsby, F. Norman; and Scamehorn, John F., 4,696,726, Cl. 204-182.400.

Schachter, Rozalie; Viscogliosi, Marcello; Bunz, Lewis A.; Olego, Diego J.; Serreze, Harvey B.; and Raccah, Paul M., to Stauffer Chemical Company. Passivation of InP by plasma deposited phosphorus. 4,696,828, Cl. 427-38.000.

Schaper, Hermann: *See*—
Kaltmann, Hans-Joachim; and Schaper, Hermann, 4,696,234, Cl. 102-308.000.

Schauder, Colin D.; and Heinrich, Theodore M., to Westinghouse Electric Corp. Voltage source inverter and variable frequency, constant voltage AC motor drive embodying the same. 4,697,131, Cl. 318-762.000.

Schaudt Maschinenbau GmbH: *See*—
Belthle, Heinz, 4,696,130, Cl. 51-293.000.

Schauer, Friedrich; and Berthold, Hans, to Kabelmetal Electro Gesellschaft mit beschrankter Haftung. Device for transferring current between two contact points which are movable relative to each other. 4,696,523, Cl. 439-11.000.

Schepky, Gottfried; Brickl, Rolf; Rupprecht, Eckhard; and Greischel, Andreas. Anti-diabetic pharmaceutical forms and the preparation thereof. 4,696,815, Cl. 424-80.000.

Schering Aktiengesellschaft: *See*—
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Schering Corporation: *See*—
Green, Michael J.; and Saksena, Anil K., 4,696,946, Cl. 514-574.000.

Scheuneman, James H.; Meyer, Joseph H.; and Mackenthun, Donald W., to Unisys Corporation. Partial duplication of pipelined stack with data integrity checking. 4,697,233, Cl. 364-200.000.

Schilling, Edward F.: *See*—
Roos, Hartog J.; and Schilling, Edward F., 4,697,075, Cl. 250-213.0VT.

Schilling, Roland, to Telefunken Electronic GmbH. Solar generator. 4,697,042, Cl. 136-244.000.

Schimanek, Hans-Joachim: *See*—
Bauer, Anton E.; Billmann, Gerhard; Rathke, Jorg; Schimanek, Hans-Joachim; Schrott, Georg W.; and Wodok, Hans, 4,696,537, Cl. 350-96.200.

Schine, Jonathan M., to High Resolution Television, Inc. High resolution dot-matrix character display. 4,697,177, Cl. 340-728.000.

Schleich, Jean-Baptiste, to Arbed S.A. Beam-column junction. 4,696,137, Cl. 52-251.000.

Schliemann, Harald: *See*—
Vondernau, Werner; Weber, Jurgen; Nickel, Hans; Wissmann, Michael; and Schliemann, Harald, 4,696,264, Cl. 123-73.00V.

Schmidt, Eric R., to Uarco Incorporated. Differential pressure sensitive adhesive joined business form. 4,696,843, Cl. 428-41.000.

Schmidt, Karlheinz: *See*—
Vomhof, Paul; Schmidt, Karlheinz; and Oster, Peter, 4,696,434, Cl. 241-282.200.

Schmidt, Paul J.; and Hung, William M., to Hilton-Davis Chemical Co., The. 9-julolidinyl derivatives and process of preparing them. 4,697,018, Cl. 546-94.000.

Schmidt, Richard; and Pizzo, Joseph A., to Enviro-Spray Systems Incorporated. Automatic container stuffing apparatus and method. 4,696,145, Cl. 53-436.000.

Schmidt, Robert J., to UOP Inc. Xylene producing process having staged catalytic conversion of ethylbenzene. 4,697,039, Cl. 585-477.000.

Schmidt, Werner: *See*—
Grauel, Christoph; Kittel, Ludwig; Schmidt, Werner; and Wellens, Ulrich, 4,697,260, Cl. 370-18.000.

Schmitt, Paul S., to Corning Glass Works. Kinematically determinate glass pressing mold assembly and method of use. 4,696,692, Cl. 65-102.000.

Schmitz, Herman J. R.: *See*—
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Sher, Arden, to SRI International. Integrated circuit having dislocation free substrate. 4,697,202, Cl. 357-63.000.
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Sonoyama, Takayasu; Yagi, Shigeo; and Kageyama, Bunji, 4,696,897, Cl. 435-42.000.

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Keller, Wolfgang, 4,696,716, Cl. 156-605.000.
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le Chatelier, Robert; Sinic, Andre ; and Diefenbach, Jean-Jacques, 4,696,334, Cl. 152-417.000.

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Olschewski, Armin; Brandenstein, Manfred; Hetterich, Hermann; and Kunkel, Heinrich, 4,696,083, Cl. 29-148.40C.

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Lardellier, Alain M. J., 4,696,619, Cl. 415-138.000.

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Collin, Andre; and Wautier, Henri, 4,697,029, Cl. 558-92.000.

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Osawa, Eiichi; Tanaka, Masato; Yoshizawa, Mamoru; Nakai, Jun; and Kojima, Yuichi, 4,697,212, Cl. 360-48.000.
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Shionoya, Toshio, 4,696,550, Cl. 350-351.000.
Shirota, Norihisa, 4,697,248, Cl. 364-754.000.

Tsukahara, Nobuhiko, 4,697,216, Cl. 360-97.000.
Yamazaki, Jun; and Ito, Yukio, 4,696,879, Cl. 430-24.000.
South Park Sales & Mfg., Inc.: *See*—
Pinkney, James, 4,696,595, Cl. 402-54.000.
Southerland, Bob R.: *See*—
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Cheal, James; Fitzsimmons, James R.; and Foley, Edward J., 4,697,184, Cl. 342-28.000.
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Clayton, Colin G.; and Spackman, Ramon, 4,696,782, Cl. 376-159.000.
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Chisholm, Donald P., Jr., 4,696,392, Cl. 198-836.000.
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O'Sullivan, Harry M., 4,697,281, Cl. 379-59.000.
Spectrum Control, Inc.: *See*—
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Spence-Bate, Harry A. H., 4,697,194, Cl. 346-110.00V.
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Spindler, Irvin, to George Koch Sons, Inc. Fluid wash spray paint system. 4,696,254, Cl. 118-610.000.
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SRI International: *See*—
Sher, Arden, 4,697,202, Cl. 357-63.000.
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Verheijen, Egidius J. M., 4,696,960, Cl. 524-100.000.
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Lish, Charles A., 4,697,153, Cl. 330-277.000.
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Henderson, Richard S.; Tenhover, Michael A.; and Grasselli, Robert K., 4,696,703, Cl. 148-403.000.
Lysandrou, Michael C.; and Dulaney, Clarence L., 4,696,752, Cl. 252-8.553.
Tenhover, Michael A., 4,696,731, Cl. 204-290.00R.
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Kasten, Donald A., 4,696,582, Cl. 384-18.000.
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Pitt, Gilles D.; Extance, Philip; and Jones, Roger E., 4,696,543, Cl. 350-96.230.
Stanfield, William G.: *See*—
Daigle, Richard A., Sr.; Stanfield, William G.; and Crenshaw, Michael E., 4,696,602, Cl. 405-205.000.
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Stanley, Sandra M. Stand for polishing artificial fingernails. 4,696,316, Cl. 132-73.000.
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Bolzan, Louis F., 4,697,028, Cl. 558-89.000.
Hardy, Thomas A.; and Walsh, Edward N., 4,697,030, Cl. 558-163.000.
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Telschow, Jeffrey E., 4,696,774, Cl. 260-543.00R.
STC, plc: *See*—
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Extance, Philip; and Jones, Roger E., 4,697,146, Cl. 324-244.000.
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Danaczko, Mark A.; Finn, Lyle D.; Glasscock, M. Sidney; Piazza, Michael P.; Steele, Kenneth M.; and Weaver, Timothy O., 4,696,603, Cl. 405-227.000.
Finn, Lyle D.; and Steele, Kenneth M., 4,696,604, Cl. 405-227.000.
Steffee, Arthur D., to AcroMed Corporation. Apparatus for straightening spinal columns. 4,696,290, Cl. 128-69.000.
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Steinmetz, Floyd, Jr. Free drop liquid container with extendable spout. 4,696,398, Cl. 206-521.000.
Stenger, Barbara J. Information reference book and indexing system. 4,696,491, Cl. 283-37.000.
Stephan, Eberhart. Portable apparatus for taking blood samples. 4,696,309, Cl. 128-762.000.
Sterling Drug Inc.: *See*—
Lesher, George Y.; and Singh, Baldev, 4,697,021, Cl. 546-288.000.
Stern, Lee W.: *See*—
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Stevens, Timothy S.; and Small, Hamish, to Dow Chemical Company, The. Apparatus and method for the determination of water by liquid chromatography. 4,696,904, Cl. 436-39.000.
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Doerman, Eryk S.; Turner, William J.; Homer, David A.; Stewart, Andrew D. G.; and Clarke, Ian, 4,696,358, Cl. 177-145.000.
Stewart, David: *See*—
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Stewart, Peter A. E.; Hawkesworth, Michael R.; and Witcomb, Roger C., to Rolls-Royce plc. Analyzing fluid flows within hollow bodies. 4,697,079, Cl. 250-303.000.
Stich, Michael C.; Resman, John B.; Ottesen, Hjalmar H.; and Anderson, Todd B., to International Business Machines Corporation. Adaptive control technique for a dynamic system. 4,697,127, Cl. 318-561.000.
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Stokes, Dale R. Load sensing alarm condition monitor. 4,697,173, Cl. 340-684.000.
Stoll, Donald L., to Richwood Industries, Inc. Conveyor belt scraper blade assembly with contoured surface. 4,696,388, Cl. 198-493.000.
Stolov, Adi: *See*—
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O'Keeffe, Michael J.; Graba, James M.; and Noyes, George L., 4,697,167, Cl. 340-347.0DD.
Storni, Angelo; and Meisels, Alex, to Ciba-Geigy Corporation. Derivatives of 2,4-thiazolidinedione. 4,697,020, Cl. 548-184.000.
Storz Instrument Company: *See*—
Higgins, Daniel E.; and Easley, James C., 4,696,298, Cl. 128-305.000.
Stowell, Dennis E. Solar heated canteen. 4,696,284, Cl. 126-437.000.
Straub, Hermann, to Sulzer Brothers Limited. Nuclear reactor installation. 4,696,791, Cl. 376-299.000.
Strausburg, Larry D., to Monarch Marking Systems, Inc. Hand-held tag attacher, method of attaching tags and fasteners. 4,696,422, Cl. 227-39.000.
Strecker, Dennis. Blow dryer holding device. 4,696,447, Cl. 248-206.300.
Strid, Eric W.: *See*—
Lockwood, Larry R.; Gleason, Kimberly R.; and Strid, Eric W., 4,697,143, Cl. 324-158.00P.

Strobel, Bernhard; and Ratzel, Dieter, to Bruker Medizintechnik GmbH. Process for the excitation of a sample for NMR tomography. 4,697,148, Cl. 324-309.000.

Strohl, Clair: *See—*
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Stromquist, Michael E., to Anthony's Manufacturing Company, Inc. Combined adjustable door hinge pin socket and adjustable torque rod anchor device. 4,696,078, Cl. 16-301.000.

Stubben, David W.: *See—*
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Stulberg, Bernard N.: *See—*
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Sturgis, James L. Anti-mismatch system. 4,696,326, Cl. 137-614.040.

Sturm, Elmar; and Maienfisch, Peter, to Ciba-Geigy Corporation. 5-azolylacetoxymilbemycins as ecto- and endoparasites. 4,696,922, Cl. 514-185.000.

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Sugawara, Tadashi: *See—*
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Sugaya, Toyomi: *See—*
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Sugihara, Junpei; Imai, Takeshi; Toida, Shuzo; and Takahashi, Ikuzo, to Toray Silicon Co., Ltd. Method for purifying alkoxysilane. 4,697,027, Cl. 556-466.000.

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Sugimori, Shigeru: *See—*
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Sugimoto, Tamio: *See—*
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Sugimoto, Yoshimi: *See—*
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Sugiyama, Hiroyuki, to Victor Company of Japan, Ltd. Jitter compensation system in a rotary recording medium reproducing apparatus. 4,697,257, Cl. 369-43.000.

Suh, John T.; Piwinski, John J.; Jones, Howard; and Neiss, Edward S., to USV Pharmaceutical Corporation. Benzothiadiazole compounds for treating hypertension. 4,696,939, Cl. 514-361.000.

Suh, Kyung S., to Dsung Precision Company. Electronic lock and key. 4,697,171, Cl. 340-543.000.

Sukigara, Motoyuki; and Yasuda, Kazuhiko, to Teac Corporation. Tape speed and tension control system for a magnetic tape cassette apparatus. 4,696,439, Cl. 242-186.000.

Sulc, Jiri ; Vondracek, Petr; and Lopour, Petr, to Ceskoslevenska Akademie Ved. Hydrophilic silicone composite and the method for producing thereof. 4,696,974, Cl. 525-92.000.

Sullivan, Daniel J., to Motorola, Inc. Epitaxial front seal for a wafer. 4,696,701, Cl. 148-33.500.

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Sumimura, Shin-ichi; and Tazawa, Akira, to Toray Silicone Company, Ltd. Method for producing a silicone polymer-filler mixture. 4,696,970, Cl. 524-860.000.

Sumitomo Chemical Company, Limited: *See—*
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Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.
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Sumitomo Electric Industries, Ltd.: *See—*
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Summers, John K., to Better Life International, Inc. Herbal snuff composition. 4,696,315, Cl. 131-359.000.

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Suzuki, Hiroshi: *See—*
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Suzuki, Kazuto: *See—*
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Suzuki, Koji: *See—*
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Suzuki, Makoto: *See—*
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Suzuki, Yoshihiro: *See—*
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Suzuki, Yoshio: *See—*
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Suzumura, Masanaga: *See—*
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Svensson, Heino: *See—*
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Swanhart, William G., Jr.: *See—*
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Swendrowski, Steven D.: *See—*
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Swenton, John S.; Morrow, Gary W.; and Priebe, Waldemar, to Ohio State University Research Foundation. 1-fluoro, 4-fluoro, and 1,4-difluoro anthracycline anticancer antibiotics. 4,697,005, Cl. 536-6.400.

Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., to Allied Corporation. Oxidized sulfur derivatives of diaminophosphinyl compounds as urease inhibitors and urease inhibited urea based fertilizer compositions. 4,696,693, Cl. 71-28.000.

Swoboda, Johann: *See—*
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Tabuchi, Takahisa: *See—*
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Taga Electric Co., Ltd.: *See*—
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Tagami, Kiyoshi: *See*—
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Taguchi, Takasi: *See*—
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Taguchi, Yoshinori: *See*—
Murakami, Azuma; Taguchi, Yoshinori; and Yamanami, Tsuguya, 4,697,244, Cl. 364-520.000.
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Taiho Pharmaceutical Company, Limited: *See*—
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Takagi, Kunihiko: *See*—
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Sugihara, Junpei; Imai, Takeshi; Toida, Shuzo; and Takahashi, Ikuzo, 4,697,027, Cl. 556-466.000.
Takahashi, Koichiro: *See*—
Shirasaki, Shin-ichi; Hotta, Yasunari; Yamamura, Hiroshi; Matsuda, Shin-ichi; Kakegawa, Kazuyuki; Moriyoshi, Yusuke; Takahashi, Koichiro; and Haneda, Hajime, 4,696,810, Cl. 423-593.000.
Takahashi, Kouji: *See*—
Harigaya, Isao; and Takahashi, Kouji, 4,696,440, Cl. 242-191.000.
Takahashi, Masatoshi: *See*—
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,696,858, Cl. 428-323.000.
Takahashi, Sadahiro: *See*—
Fujishiro, Takeshi; Takahashi, Sadahiro; and Kaneko, Takanobu, 4,696,489, Cl. 280-707.000.
Takahashi, Sadatoshi: *See*—
Tsuji, Sadahiko; Takahashi, Sadatoshi; and Fujibayashi, Kazuo, 4,696,553, Cl. 350-427.000.
Takahashi, Toshio: *See*—
Yamauchi, Yoshiyuki; Ohara, Toshio; and Takahashi, Toshio, 4,696,342, Cl. 165-152.000.
Takahashi, Tsutomu: *See*—
Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.
Takanashi, Hiroyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Disc automatically setting device of a disc player. 4,697,259, Cl. 369-75.200.
Takano, Nobuyoshi: *See*—
Mitsumaki, Hiroshi; Ono, Naoya; Shindo, Isao; and Takano, Nobuyoshi, 4,696,183, Cl. 73-19.000.
Takegawa, Hiroaki: *See*—
Yamamoto, Toshiaki; Kako, Hiroyoshi; Shibata, Takuo; Izuo, Takashi; Kamimae, Hajime; and Takegawa, Hiroaki, 4,696,379, Cl. 188-299.000.
Takeshita, Fumitaka: *See*—
Toyota, Makoto; Takeshita, Fumitaka; and Arakawa, Satoshi, 4,697,210, Cl. 358-98.000.
Takeuchi, Kazumasa; Iwadachi, Takaharu; and Ikushima, Kazuo, to NGK Insulators, Ltd. Material for lead frames. 4,696,704, Cl. 148-412.000.
Takeuchi, Masashi: *See*—
Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; Tsukase, Masaaki; and Kato, Masatoshi, 4,696,887, Cl. 430-203.000.
Takeuchi, Tatsuo: *See*—
Inaba, Yutaka; Satomura, Hiroshi; Nagase, Yukio; Takeuchi, Tatsuo; Egami, Hidemi; and Hosaka, Akihito, 4,697,196, Cl. 346-159.000.
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, to Mitsubishi Jidosha Kogyo K.K. Vehicle suspension apparatus. 4,696,483, Cl. 280-6.00H.
Takubo, Hiroichi: *See*—
Kohno, Kouji; Takubo, Hiroichi; and Ito, Toshinobu, 4,696,267, Cl. 123-192.00B.
Takuma, Hiroshi: *See*—
Tsuji, Yoshiomi; Maruyama, Ichiro; and Takuma, Hiroshi, 4,696,598, Cl. 405-115.000.
Talbott, Robert D.: *See*—
Puski, Gabor; Hartman, Grant H., Jr.; and Talbott, Robert D., 4,697,004, Cl. 530-378.000.
Tamura, Hifumi: *See*—
Ishitani, Tohru; Tamura, Hifumi; and Umemura, Kaoru, 4,697,086, Cl. 250-492.200.
Tamura, Toshihisa: *See*—
Ohtani, Teruo; Tamura, Toshihisa; Ikeda, Yuji; Araikawa, Mutsuya; and Kywata, Kazuyoshi, 4,696,635, Cl. 425-330.000.
Tamura, Yasuji, to Sanden Corporation. Slip detecting device for a prime mover. 4,697,091, Cl. 290-45.000.
Tanaka, Atsuo; and Dohnomoto, Tadashi, to Toyota Jidosha Kabushiki Kaisha. Fiber reinforced metal composite material. 4,696,866, Cl. 428-614.000.
Tanaka, Hironori; Matsumoto, Masafumi; and Kotani, Matahira, to Sharp Kabushiki Kaisha. Paper supplying device. 4,696,462, Cl. 271-10.000.
Tanaka, Hirotoshi: *See*—
Masuda, Noboru; Asano, Michio; Hayashi, Takehisa; Tanaka, Hirotoshi; and Masaki, Akira, 4,697,110, Cl. 307-475.000.
Tanaka, Kunihiko: *See*—
Hanabata, Makoto; Furuta, Akihiro; Yasui, Seimei; and Tanaka, Kunihiko, 4,696,886, Cl. 430-192.000.
Tanaka, Kunio: *See*—
Kishi, Hajimu; Seki, Masaki; and Tanaka, Kunio, 4,697,249, Cl. 364-900.000.
Tanaka, Masato: *See*—
Osawa, Eiichi; Tanaka, Masato; Yoshizawa, Mamoru; Nakai, Jun; and Kojima, Yuichi, 4,697,212, Cl. 360-48.000.
Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle suspension apparatus. 4,697,237, Cl. 364-424.000.
Tanaka, Yasuo; and Niikura, Akio, to Nippon Seiko Kabushiki Kaisha. Non-separable thrust rolling bearing. 4,696,588, Cl. 384-615.000.
Tange, Kyoichi: *See*—
Sasaki, Torahiko; Sato, Kazuo; Ohkawa, Masahiro; Suzuki, Yoshihiro; Kubota, Masato; Nakao, Hatsuo; and Tange, Kyoichi, 4,696,870, Cl. 429-14.000.
Tani, Nobutaka: *See*—
Ohnishi, Michikazu; and Tani, Nobutaka, 4,696,670, Cl. 604-49.000.
Taniguchi, Yasutaka: *See*—
Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,697,237, Cl. 364-424.000.
Tarman, Paul B.: *See*—
Ghosh, Sambhunath; Chynoweth, David P.; and Tarman, Paul B., 4,696,746, Cl. 210-603.000.
Taruki, Takashi: *See*—
Nakazato, Yukitaka; Hashimoto, Kenji; and Taruki, Takashi, 4,696,463, Cl. 271-176.000.
Tarumi, Noriyoshi: *See*—
Yano, Hidetoshi; Seimiya, Ryubun; Tarumi, Noriyoshi; Demizu, Hiromi; and Obu, Makoto, 4,696,255, Cl. 118-653.000.
Tasch, Franz: *See*—
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.
Tatani, Atsushi: *See*—
Shinoda, Naoharu; Tatani, Atsushi; Onizuka, Masakazu; Okino, Susumu; and Shimizu, Taku, 4,696,804, Cl. 423-242.000.
Shinoda, Naoharu; Tatani, Atsushi; Onizuka, Masakazu; Okino, Susumu; and Shimizu, Taku, 4,696,805, Cl. 423-242.000.
Tatekawa, Masaichiro: *See*—
Urata, Yoshihito; Tatekawa, Masaichiro; and Sasaki, Toshiharu, 4,696,562, Cl. 355-3.00R.
Tatematsu, Hiromu; and Miyabayashi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Substrate processed for electroless plating for printed wiring pattern and process for manufacturing the processed substrate. 4,696,861, Cl. 428-328.000.
Tatemoto, Minoru: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,696,483, Cl. 280-6.00H.
Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,697,237, Cl. 364-424.000.
Taurus Controls Limited: *See*—
Taylor, James C., 4,696,194, Cl. 73-861.660.
Taylor, James C., to Taurus Controls Limited. Fluid flow measurement. 4,696,194, Cl. 73-861.660.
Taylor, William M.: *See*—
Schmitz, Thomas R.; and Taylor, William M., 4,696,494, Cl. 285-18.000.
Tazawa, Akira: *See*—
Sumimura, Shin-ichi; and Tazawa, Akira, 4,696,970, Cl. 524-860.000.
Teac Corporation: *See*—
Enami, Katsuya; Tsuyuguchi, Hiroshi; and Sakaguchi, Takahiro, 4,697,129, Cl. 318-696.000.
Matsunaga, Hiroshi; and Morita, Shinichi, 4,696,099, Cl. 29-603.000.
Sukigara, Motoyuki; and Yasuda, Kazuhiko, 4,696,439, Cl. 242-186.000.
Tebbe, Frederick N., to Du Pont de Nemours, E. I., and Company. Melt-formable organoaluminum polymer. 4,696,968, Cl. 524-610.000.
Tegal Corporation: *See*—
Drage, David J., 4,697,089, Cl. 250-561.000.

Tegart, Harold G. Golf course. 4,696,474, Cl. 273-176.00A.

Teijin Limited: *See*—
Okaniwa, Hiroshi; Nakatani, Kenji; and Sato, Tetsuo, 4,697,041, Cl. 136-244.000.

Tektronix, Inc.: *See*—
Breya, Edward F., 4,696,105, Cl. 29-840.000.
Gjesdal, Harvey J., 4,696,089, Cl. 29-451.000.

Teledyne Industries, Inc.: *See*—
Barbeau, Dennis E., 4,697,238, Cl. 364-431.020.

Telefonaktiebolaget LM Ericsson: *See*—
Skoog, Karl I. L., 4,697,276, Cl. 375-114.000.

Telefunken Electronic GmbH: *See*—
Schilling, Roland, 4,697,042, Cl. 136-244.000.

Telschow, Jeffrey E., to Stauffer Chemical Company. Decolorizing arylsulfonyl halides. 4,696,774, Cl. 260-543.00R.

Tenhover, Michael A., to Standard Oil Company, The. Amorphous metal-based composite oxygen anodes. 4,696,731, Cl. 204-290.00R.

Tenhover, Michael A.: *See*—
Henderson, Richard S.; Tenhover, Michael A.; and Grasselli, Robert K., 4,696,703, Cl. 148-403.000.

Terada, Masafumi: *See*—
Yamashita, Tatsuo; Terada, Masafumi; and Suzuki, Koji, 4,696,895, Cl. 435-7.000.

Terashima, Shigeo: *See*—
Sekimoto, Yoshihiro; Terashima, Shigeo; and Kojima, Kunio, 4,696,566, Cl. 350-255.000.

Tetard, Roger: *See*—
David, Bernard; and Tetard, Roger, 4,696,228, Cl. 101-123.000.

Texaco Inc.: *See*—
Howlett, Donald L., 4,697,255, Cl. 367-146.000.
Nieh, Edward C. Y., 4,696,803, Cl. 423-228.000.

Texas Instruments Incorporated: *See*—
De Filippis, Pietro; Calenda, Ciro; Notaro, Giuseppe; and Boulanger, Henry, 4,696,579, Cl. 374-187.000.
Doering, Robert R.; and Armstrong, Gregory J., 4,696,092, Cl. 437-5.000.
Hofer, Dean A.; Carlson, Daniel J.; and Pecak, Matthew L., 4,697,192, Cl. 343-895.000.
Landes, James L., 4,696,425, Cl. 228-1.100.

Textron, Inc.: *See*—
Brandon, George M., 4,697,135, Cl. 322-24.000.

Thatcher, Richard E.: *See*—
Turano, Louis R.; Callaham, William T.; Sherwood, John F.; and Thatcher, Richard E., 4,696,312, Cl. 131-109.100.

Thermacore, Inc.: *See*—
Eastman, George Y., 4,697,205, Cl. 357-82.000.

Thermal Energy Stroage, Inc.: *See*—
Jensen, Eric A.; Hitchin, James; Tsai, Albert G.; and Arrhenius, Gustaf O., 4,696,338, Cl. 165-1.000.

Thiele, Horst: *See*—
Scholl, Hans; Thiele, Horst; and Hagemann, Eckhard, 4,696,242, Cl. 112-121.140.

Thimineur, Raymond J.; and Raleigh, William J., to General Electric Company. Emulsion polymerized silicone emulsions having siloxane-bonded UV absorbers. 4,696,969, Cl. 524-762.000.

Thomas, David M.; and Tubb, Leonard J., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence; and Control Data Canada, Ltd. Algorithm for radar coordinate conversion in digital scan converters. 4,697,185, Cl. 342-185.000.

Thomas, Mammen, to Advanced Micro Devices, Inc. Process for isolation using self-aligned diffusion process. 4,696,095, Cl. 437-78.000.

Thomey, Henry W.; and Heuninck, John B., to Dyneer Corporation. Belt tensioner. 4,696,663, Cl. 474-133.000.

Thompson, Robert E., to Chevron Research Company. Armored optical fiber cable. 4,696,542, Cl. 350-96.230.

Thomson-CSF: *See*—
Doriath, Gerard; Hartemann, Pierre; and Jacobelli, Alain, 4,697,145, Cl. 324-244.000.
Yves, Henry; Nicollet, Andre; and Villard, Michel, 4,696,094, Cl. 437-23.000.

Tibbals, E. C., Jr. Compound knitting needle. 4,696,170, Cl. 66-120.000.

Tice, Thomas R.: *See*—
Magrath, Joseph M.; Tice, Thomas R.; Meyers, William E.; and Dappert, Thomas O., 4,696,258, Cl. 119-1.000.

Tielemans, Leonardus P. M., to U.S. Philips Corporation. Self-cleaning air bearing comprising a flow equalizing groove at the bearing periphery. 4,696,584, Cl. 384-107.000.

Tilley, Jefferson W.: *See*—
Mullin, John G., Jr.; Nakamura, Keiji; Tilley, Jefferson W.; and Watanabe, Hiroshi, 4,696,930, Cl. 514-256.000.

Timgren, Carl J., to Perlos Oy. Cuvette set for blood analysis. 4,696,798, Cl. 422-102.000.

Todoroki, Tsunehiko: *See*—
Yamamoto, Hiromasa; Shida, Sankichi; and Todoroki, Tsunehiko, 4,696,100, Cl. 29-605.000.

Toho Beslon Co., Ltd.: *See*—
Shimazaki, Kenji, 4,696,742, Cl. 210-287.000.

Toida, Shuzo: *See*—
Sugihara, Junpei; Imai, Takeshi; Toida, Shuzo; and Takahashi, Ikuzo, 4,697,027, Cl. 556-466.000.

Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sunduiqst, Hannu K., to Farmos Group Ltd. Novel tri-phenyl alkane and alkene derivatives and their preparation and use. 4,696,949, Cl. 514-648.000.

Tokiwa Kogyo Co., Ltd.: *See*—
Noh, Chuji, 4,696,147, Cl. 53-550.000.

Tokumo, Akio; Takagi, Kazunori; and Mori, Shuichi, to Pioneer Electronic Corporation. Headrest-mounted acoustic device. 4,696,370, Cl. 181-141.000.

Tokuno, Masateru; Sawada, Tetsuya; and Mori, Yasuharu, to Rengo Co., Ltd. Rotary cutter. 4,696,212, Cl. 83-343.000.

Tokuono, Shinya: *See*—
Yamashita, Ichiro; Wakamiya, Masayuki; Hase, Hiroyuki; and Tokuono, Shinya, 4,696,192, Cl. 73-728.000.

Tokyo Automatic Machinery Works, Ltd.: *See*—
Kumata, Katsuhiko; Endo, Isao; Numa, Syozi; Hirose, Ichiro; Sagawa, Takayoshi; and Matono, Katsuyoshi, 4,696,617, Cl. 414-422.000.

Tokyo Electric Co., Ltd.: *See*—
Okuno, Shigeru; Torisawa, Yoshihiro; Endo, Mitsuharu; Nakayama, Tetsuroh; Shimosato, Masashi; and Fukushima, Takafumi, 4,696,589, Cl. 400-119.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Furuyama, Tohru; and Uchida, Yukimasa, 4,697,252, Cl. 365-189.000.

Tolino, Ralph W.; King, William E.; Blickenderfer, Jack L.; and Roth, Charles H., Jr., to Westinghouse Electric Corp. System for manipulating radioactive fuel rods within a nuclear fuel assembly. 4,696,784, Cl. 376-245.000.

Tom, Glenn M., to Hercules Incorporated. Scavengers for the removal of impurities from arsine and phosphine. 4,696,953, Cl. 521-146.000.

Tomita, Seisuke; and Egashira, Yoshinori, to Bridgestone Corporation. Thread-wound golf ball. 4,696,475, Cl. 273-227.000.

Tomizuka, Mitsuo, to Ricoh Company, Ltd. Collapsible overhead projector. 4,696,557, Cl. 353-66.000.

Tomoda, Masayasu: *See*—
Oka, Masahiko; Ueta, Yutaka; Kano, Hideo; Tomoda, Masayasu; and Kawachi, Shoji, 4,696,989, Cl. 526-254.000.

Tomy Kogyo Co., Inc.: *See*—
Tsuzuki, Akio, 4,696,477, Cl. 273-241.000.

Tonge, Gary J., to Independent Broadcasting Authority. Method and apparatus for enhancing vertical chrominance resolution. 4,697,206, Cl. 358-14.000.

Toray Silicon Co., Ltd.: *See*—
Sugihara, Junpei; Imai, Takeshi; Toida, Shuzo; and Takahashi, Ikuzo, 4,697,027, Cl. 556-466.000.

Toray Silicone Company, Ltd.: *See*—
Sumimura, Shin-ichi; and Tazawa, Akira, 4,696,970, Cl. 524-860.000.
Yoshitake, Makoto; and Kishimoto, Keiichi, 4,696,756, Cl. 252-78.300.

Torisawa, Yoshihiro: *See*—
Okuno, Shigeru; Torisawa, Yoshihiro; Endo, Mitsuharu; Nakayama, Tetsuroh; Shimosato, Masashi; and Fukushima, Takafumi, 4,696,589, Cl. 400-119.000.

Torres, Ronald; Mayer, Edward; and Nelson, Steve, to Mattel, Inc. Reconfigurable toy. 4,696,656, Cl. 446-376.000.

Tosbac Computer System Co., Ltd.: *See*—
Iwahashi, Hiroshi; Asano, Masamichi; Momodomi, Masaki; Minagawa, Hidenobu; Suzuki, Kazuto; and Narita, Akira, 4,697,101, Cl. 307-452.000.

Toshiba Micro-Computer Engineering Corp.: *See*—
Iwahashi, Hiroshi; Asano, Masamichi; Momodomi, Masaki; Minagawa, Hidenobu; Suzuki, Kazuto; and Narita, Akira, 4,697,101, Cl. 307-452.000.

Toth, Miklos; Endresz, Valeria; Beladi, Ilona; and Toth, Sandor, to EGYT Gyogyszervegyeszeti Gyar. Process for the preparation of human leukocyte and human gamma interferon. 4,696,899, Cl. 435-68.000.

Toth, Sandor: *See*—
Toth, Miklos; Endresz, Valeria; Beladi, Ilona; and Toth, Sandor, 4,696,899, Cl. 435-68.000.

Towlson, Howard E., to General Electric Company. Low cost tooling replication technique. 4,696,722, Cl. 204-6.000.

Toyne, Kenneth J.: *See*—
Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, 4,696,549, Cl. 350-350.00R.

Toyo Jozo Company, Ltd.: *See*—
Matsumura, Takafumi; and Morishita, Masataka, 4,696,822, Cl. 424-490.000.

Toyoshima, Yoshiki: *See*—
Higashimura, Toshinobu; Sawamoto, Mitsuo; Toyoshima, Yoshiki; Kanagawa, Shuuichi; Takahashi, Tsutomu; and Saito, Noriaki, 4,696,988, Cl. 526-220.000.

Toyota Jidosha K.K.: *See*—
Awano, Yoshiro; Suzuki, Hiroshi; Mizuno, Takaji; Ueguri, Shigeo; and Higashida, Kenji, 4,697,062, Cl. 219-130.510.

Toyota Jidosha Kabushiki Kaisha: *See*—
Hattori, Kyo; Kato, Kazuo; and Morita, Shuji, 4,696,201, Cl. 74-467.000.
Ito, Toshimitsu; and Murata, Chigaku, 4,696,278, Cl. 123-493.000.
Kushi, Naoto; Okano, Hiroshi; Kobayashi, Nobuyuki; and Sugita, Naoki, 4,696,275, Cl. 123-478.000.
Nohira, Hidetaka, 4,696,265, Cl. 123-90.160.
Sasaki, Torahiko; Sato, Kazuo; Ohkawa, Masahiro; Suzuki, Yoshihiro; Kubota, Masato; Nakao, Hatsuo; and Tange, Kyoichi, 4,696,870, Cl. 429-14.000.
Sato, Kunihiko, 4,696,274, Cl. 123-440.000.

Tanaka, Atsuo; and Dohnomoto, Tadashi, 4,696,866, Cl. 428-614.000.
Yamamoto, Toshiaki; Kako, Hiroyoshi; Shibata, Takuo; Izuo, Takashi; Kamimae, Hajime; and Takegawa, Hiroaki, 4,696,379, Cl. 188-299.000.
Toyota, Makoto; Takeshita, Fumitaka; and Arakawa, Satoshi, to Fuji Photo Optical Co., Ltd. Endoscope for displaying a normal image. 4,697,210, Cl. 358-98.000.
Traczyk, Jan; Brejnak, Jacek; and Kawalec, Krzysztof, to Instytut Lotnictwa. Ultrasonic channel diffuser. 4,696,622, Cl. 415-211.000.
Trans-World Manufacturing Corporation: *See*—
Franklin, Robert P., 4,696,407, Cl. 211-183.000.
Traxler, Manfred: *See*—
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.
Triani, Ronald J.: *See*—
Meczkowski, Frank J.; and Triani, Ronald J., 4,696,824, Cl. 426-102.000.
Trimmel, Wolfgang: *See*—
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.
Triple "F", Inc.: *See*—
Zeller, Zellis C., 4,696,634, Cl. 425-237.000.
Triponez, Andre : *See*—
Muller, Jacques; and Triponez, Andre , 4,696,577, Cl. 368-276.000.
Trischler, Ferenc: *See*—
Megyeri, Gabor; Keve, Tibor; Galambos, Janos; Kovacs, Lajos, Jr.; Stefko, Bela; Bogsch, Erik; and Trischler, Ferenc, 4,697,017, Cl. 544-346.000.
Triseal Corporation: *See*—
Karcher, Merrill, 4,696,479, Cl. 277-37.000.
Trosky, William J.: *See*—
Moore, William H.; Gutowski, Charles M.; Trosky, William J.; and Butler, Thomas A., 4,697,243, Cl. 364-513.000.
Trucksess, A. William. Security enclosure for transaction machine. 4,696,239, Cl. 109-24.100.
Trumpf GmbH & Co.: *See*—
Bitzel, Hubert, 4,696,211, Cl. 83-49.000.
Trutek Research, Inc.: *See*—
Shene, William R.; Nowacki, Christopher; and Brisson, Alfred G., 4,696,299, Cl. 128-328.000.
TRW Automotive Products, Inc.: *See*—
Hamilton, Brian K., 4,696,705, Cl. 149-21.000.
TRW Inc.: *See*—
Gat, Nahum, 4,696,160, Cl. 60-258.000.
Trzaskos, William J.: *See*—
Dauplaise, David L.; and Trzaskos, William J., 4,696,770, Cl. 252-700.000.
Tsai, Albert G.: *See*—
Jensen, Eric A.; Hitchin, James; Tsai, Albert G.; and Arrhenius, Gustaf O., 4,696,338, Cl. 165-1.000.
Tsao, Ying-Yen P., to Mobil Oil Corporation. Process for selectively hydrogenating polycondensed aromatics. 4,696,733, Cl. 208-144.000.
Tso, Rosa Y. M.: *See*—
Mui, Paul Y. H.; and Tso, Rosa Y. M., 4,697,228, Cl. 362-352.000.
Tsuezuki, Yoshio: *See*—
Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, 4,696,881, Cl. 430-57.000.
Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, 4,696,882, Cl. 430-57.000.
Saitoh, Keishi; Sueda, Tetsuo; Ogawa, Kyosuke; Misumi, Teruo; Tsuezuki, Yoshio; and Kanai, Masahiro, 4,696,883, Cl. 430-57.000.
Saitoh, Keishi; Kanai, Masahiro; Sueda, Tetsuo; Misumi, Teruo; Tsuezuki, Yoshio; and Ogawa, Kyosuke, 4,696,884, Cl. 430-58.000.
Tsuji, Sadahiko; Takahashi, Sadatoshi; and Fujibayashi, Kazuo, to Canon Kabushiki Kaisha. Zoom lens having a large zoom ratio. 4,696,553, Cl. 350-427.000.
Tsuji, Yoshiomi; Maruyama, Ichiro; and Takuma, Hiroshi, to Sumitomo Electric Industries, Ltd. Erecting/lying-down dam or sluice gate made of flexible sheet. 4,696,598, Cl. 405-115.000.
Tsukagoshi, Tetsuhito; Matsunuma, Tamotsu; and Makino, Shigeo, to Bridgestone Corporation. Pneumatic radial tire. 4,696,335, Cl. 152-535.000.
Tsukahara, Nobuhiko, to Sony Corporation. Disk drive apparatus with automatic centering arrangement. 4,697,216, Cl. 360-97.000.
Tsukase, Masaaki: *See*—
Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; Tsukase, Masaaki; and Kato, Masatoshi, 4,696,887, Cl. 430-203.000.
Tsushima, Noriyuki; and Nakajima, Hirokazu, to NTN Toyo Bearing Co., Ltd. Rolling bearing. 4,696,581, Cl. 384-565.000.
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Enami, Katsuya; Tsuyuguchi, Hiroshi; and Sakaguchi, Takahiro, 4,697,129, Cl. 318-696.000.
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Thomas, David M.; and Tubb, Leonard J., 4,697,185, Cl. 342-185.000.
Tucel Industries Inc.: *See*—
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Tukano, Moriyosi: *See*—
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Tullis, Andrew M., to United States of America, Energy. Ion detector. 4,697,083, Cl. 250-374.000.
Turano, Louis R.; Callaham, William T.; Sherwood, John F.; and Thatcher, Richard E., to Philip Morris Incorporated. Method and apparatus for producing cigarette filler. 4,696,312, Cl. 131-109.100.
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Turner, Carlton E.: *See*—
Bedford, John A.; Elsohly, Hala N.; Wilson, Marvin C.; and Turner, Carlton E., 4,696,819, Cl. 424-195.100.
Turner, William J.: *See*—
Doerman, Eryk S.; Turner, William J.; Homer, David A.; Stewart, Andrew D. G.; and Clarke, Ian, 4,696,358, Cl. 177-145.000.
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Gobert, Jean; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,943, Cl. 514-424.000.
Uarco Incorporated: *See*—
Schmidt, Eric R., 4,696,843, Cl. 428-41.000.
Ube Industries, Ltd.: *See*—
Nakajima, Kohei; Nishio, Kazuaki; and Watanabe, Hiroshi, 4,696,994, Cl. 528-176.000.
UCB Societe Anonyme: *See*—
Gobert, Jean; Giurgea, Corneliu; Geerts, Jean-Pierre; and Bodson, Guy, 4,696,942, Cl. 514-424.000.
Uchida, Kazuko: *See*—
Deguchi, Takenori; Uchida, Kazuko; Ikita, Takao; Maruhaski, Shigeaki; Hoshino, Kazuo; and Oosaki, Keiji, 4,696,724, Cl. 204-27.000.
Uchida, Yukimasa: *See*—
Furuyama, Tohru; and Uchida, Yukimasa, 4,697,252, Cl. 365-189.000.
Ude, Werner; Knebel, Joachim; and Schroeder, Guenter, to Rohm GmbH. Phosphorus-containing polyarlene ether. 4,696,993, Cl. 528-167.000.
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Karasaki, Toshihiko; Matsui, Toru; and Ueda, Hiroshi, 4,696,558, Cl. 354-406.000.
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Kamata, Kazumasa; Ueda, Kazuo; and Kitai, Kiyokazu, 4,696,973, Cl. 525-71.000.
Ueda, Yutaka: *See*—
Abe, Michiharu; Umehara, Masaakira; Sato, Tsutomu; Oba, Hideaki; Ueda, Yutaka; and Kunikane, Makoto, 4,696,892, Cl. 430-495.000.
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Oka, Masahiko; Ueta, Yutaka; Kano, Hideo; Tomoda, Masayasu; and Kawachi, Shoji, 4,696,989, Cl. 526-254.000.
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Okamura, Kiyohito; Hasegawa, Yoshio; Kuroo, Yoshiyasu; and Ugaji, Masana, 4,696,827, Cl. 427-36.000.
Uggeri, Fulvio: *See*—
Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, 4,697,036, Cl. 562-418.000.
Ugolini, Giancarlo, to Ugolini S.p.A. Refrigerated beverage dispenser, with whipper device. 4,696,417, Cl. 222-146.600.
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Ugolini, Giancarlo, 4,696,417, Cl. 222-146.600.
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Bosquet, Herman; and Ulens, Stanislas F., 4,696,723, Cl. 204-16.000.
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Aoki, Yuji; Horiuchi, Hidenaga; Umemoto, Akio; and Miura, Norio, 4,696,868, Cl. 428-690.000.
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Umemura, Kaoru: *See*—
Ishitani, Tohru; Tamura, Hifumi; and Umemura, Kaoru, 4,697,086, Cl. 250-492.200.
Umemura, Yoshihiro: *See*—
Mochizuki, Masatsugu; Jige, Masanobu; and Umemura, Yoshihiro, 4,696,672, Cl. 604-128.000.
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Boerma, Hiepke; de Jongh, Rudolph O.; and Van Dijk, Cornelis, 4,696,911, Cl. 502-159.000.
Union Siderurgique du Nord et de l'Est de la France (USINOR): *See*—
Cordier, Jean, 4,697,273, Cl. 373-72.000.
Unisys Corp.: *See*—
Finley, Rufus E., 4,697,266, Cl. 371-12.000.
Gal, Laszlo V., 4,697,139, Cl. 324-73.00R.
Scheuneman, James H.; Meyer, Joseph H.; and Mackenthun, Donald W., 4,697,233, Cl. 364-200.000.
Unitaka Ltd.: *See*—
Mochizuki, Masatsugu; Jige, Masanobu; and Umemura, Yoshihiro, 4,696,672, Cl. 604-128.000.
United Kingdom Atomic Energy Authority: *See*—
Clayton, Colin G.; and Spackman, Ramon, 4,696,782, Cl. 376-159.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Kam Ming Chan, Lawrence; Gray, George W.; Toyne, Kenneth J.; Lacey, David; Eidenschink, Rudolf; and Romer, Michael, 4,696,549, Cl. 350-350.00R.
United States of America
Air Force: *See*—
Geary, Joseph M.; and Peterson, Phillip R., 4,696,569, Cl. 356-124.000.
Army: *See*—
Behl, Wishvender K.; and Chin, Der-Tau, 4,696,103, Cl. 29-825.000.
Jones, Michael M.; Miller, Walter E., Jr.; and Mitchell, Robert R., 4,696,441, Cl. 244-3.130.
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Claytor, Thomas N.; Ockert, Carl E.; and Randall, Richard, 4,696,191, Cl. 73-600.000.
Eimerl, David, 4,697,100, Cl. 307-427.000.
Fox, Richard J., 4,697,084, Cl. 250-376.000.
Galkowski, Joseph J., 4,697,270, Cl. 372-34.000.
Ghate, Madhav R.; and Yang, Ralph T., 4,696,680, Cl. 55-25.000.
King, Wayne E., 4,697,080, Cl. 250-307.000.
Niemann, Ralph C.; Gonczy, John D.; and Nicol, Thomas H., 4,696,169, Cl. 62-514.00R.
Tullis, Andrew M., 4,697,083, Cl. 250-374.000.
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Jacobson, Kenneth A.; Daly, John W.; and Kirk, Kenneth L., 4,696,932, Cl. 514-263.000.
Interior: *See*—
Goldberg, Marvin C.; Cunningham, Kirkwood M.; and Weiner, Eugene R., 4,696,571, Cl. 356-336.000.
National Aeronautics and Space Administration: *See*—
Barber, Patrick G.; and Simpson, Norman R., 4,696,808, Cl. 423-338.000.
Navy: *See*—
Albares, Donald J.; and Reedy, Ronald E., 4,696,536, Cl. 350-96.190.
Rock, Robert G., 4,697,186, Cl. 342-189.000.
Wilson, Fred W.; and Smith, Timothy D., 4,696,362, Cl. 180-116.000.
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Baker, Geoffrey, 4,697,081, Cl. 250-338.000.
Bierhoff, Waltherus C. J.; Schuitmaker, Pieter D.; Ouwerkerk, Cornelis; and Verhoeven, Robertus J. M., 4,696,590, Cl. 400-613.000.
Bukoschek, Romuald L.; and Huszar, Reinhard, 4,696,166, Cl. 62-136.000.
De Graaff, Hendrik C.; and Voncken, Wilhelmus G., 4,697,199, Cl. 357-23.130.
Geerings, Michael P. W.; Christis, Wilhelmus J.; Fekkes, Wilhelmus F.; and Schmitz, Herman J. R., 4,697,046, Cl. 178-1.000.
Grauel, Christoph; Kittel, Ludwig; Schmidt, Werner; and Wellens, Ulrich, 4,697,260, Cl. 370-18.000.
Overath, Hilde M. A.; and Bierhoff, Martinus P. M., 4,697,258, Cl. 369-44.000.
Peemoller, Horst; and Svensson, Heino, 4,697,049, Cl. 178-18.000.
Tielemans, Leonardus P. M., 4,696,584, Cl. 384-107.000.
Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Pfennings, Leonardus C. M. G.; and Gubbels, Wilhelmus C. H., 4,697,111, Cl. 307-482.000.
Weistra, Marten P., 4,696,568, Cl. 356-28.500.
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Burr, Donald N.; Danilowicz, Paul S.; Franz, Thomas C.; Mortimer, Thomas P.; and Pero, Edward B., 4,696,156, Cl. 60-39.080.
Buxe, Paul M., 4,696,431, Cl. 239-265.150.
Horgan, John J., 4,696,159, Cl. 60-226.100.
Pettit, Harold W., Jr; Davis, Charles G.; and Walden, Frederick C., 4,696,855, Cl. 428-312.800.
Wright, Stuart C.; Stiles, Lorren, Jr.; and Adams, Don L., 4,696,445, Cl. 244-229.000.
Unitika Ltd.: *See*—
Yabushita, Yasunori; and Takagi, Kunihiko, 4,696,916, Cl. 514-25.000.
University of California, The Regents of the: *See*—
Cochrum, Kent C., 4,696,286, Cl. 128-1.00R.
University of Florida, The: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,696,676, Cl. 44-7.500.
University of Mississippi: *See*—
Bedford, John A.; Elsohly, Hala N.; Wilson, Marvin C.; and Turner, Carlton E., 4,696,819, Cl. 424-195.100.
University of Queensland: *See*—
Ness, John B., 4,697,189, Cl. 343-700.0MS.
UOP Inc.: *See*—
Schmidt, Robert J., 4,697,039, Cl. 585-477.000.
Upmeier, Hartmut, to Windmoller & Holscher. Single-screw extruder for producing thermoplastic and elastomeric products. 4,696,575, Cl. 366-80.000.
Urabe, Masaki: *See*—
Arimitsu, Hiroshi; Hatano, Kiyoshi; Nakanishi, Teruyuki; Yoshimura, Yoshio; Urabe, Masaki; and Honda, Tsurakazu, 4,697,179, Cl. 340-825.720.
Urakawa, Nobuaki: *See*—
Ohtani, Takayuki; Isobe, Mitsuo; Aono, Akira; and Urakawa, Nobuaki, 4,697,112, Cl. 307-530.000.
Urata, Yoshihito; Tatekawa, Masaichiro; and Sasaki, Toshiharu, to Matsushita Electric Industrial Co., Ltd. Multifunctional copying machine. 4,696,562, Cl. 355-3.00R.
Urban, James J.: *See*—
Kohlmetz, Charles W.; Urban, James J.; and Kenny, John, 4,696,283, Cl. 126-247.000.
Urbania, William G., to Industrial Innovations, Inc. Recycled liquid cleaning system. 4,696,073, Cl. 15-302.000.
Usami, Kyohei; and Watanabe, Katsuhiko, to Nippondenso Co., Ltd. Oxygen separating member and process for producing the same. 4,696,686, Cl. 55-158.000.
Ushida, Masao: *See*—
Matsui, Shigekazu; Kagaya, Kenichi; Ushida, Masao; and Maruyama, Kouichi, 4,696,877, Cl. 430-5.000.
USV Pharmaceutical Corporation: *See*—
Suh, John T.; Piwinski, John J.; Jones, Howard; and Neiss, Edward S., 4,696,939, Cl. 514-361.000.
Uttner, Alfred: *See*—
Leo, Rolf; Meusel, Karl-Heinz; and Uttner, Alfred, 4,696,506, Cl. 295-38.000.
VA Inc.: *See*—
Pasquarella, Stephen T., 4,697,221, Cl. 361-156.000.
Valeo: *See*—
Huber, Alain, 4,696,384, Cl. 192-70.270.
Vamatex S.p.A.: *See*—
Pezzoli, Luigi, 4,696,200, Cl. 74-434.000.
Van Buskirk, W. Jeffrey. Press for compacting small scale objects. 4,696,227, Cl. 100-902.000.
Van Coney, Robert H.: *See*—
Muckenfuhs, Delmar R.; and Van Coney, Robert H., 4,696,416, Cl. 222-109.000.
Vandame, Bertrand, to Precision Mechanique Labinal. Female electrical contact element. 4,696,530, Cl. 439-266.000.
Van Der Poorten, Christian J. E. C.: *See*—
Blanchart, Alain P. O.; and Van Der Poorten, Christian J. E. C., 4,696,872, Cl. 429-42.000.
Vandersyde, Gary L.: *See*—
Zemke, Edward H., deceased; Vandersyde, Gary L.; Rabindran, K. George; and Guenther, Kenneth L., 4,697,246, Cl. 364-563.000.
Van Der Zyl, Jad D. Fishing rod holder/carrier. 4,696,122, Cl. 43-21.200.
Van Dijk, Cornelis: *See*—
Boerma, Hiepke; de Jongh, Rudolph O.; and Van Dijk, Cornelis, 4,696,911, Cl. 502-159.000.
van Nes, Cornelis G. J.: *See*—
Verhoeven, Laurentius M.; and van Nes, Cornelis G. J., 4,696,529, Cl. 439-267.000.
Vannoni, Adrio L.: *See*—
Green, LaVerne M.; Vannoni, Adrio L.; and Pummell, Ivan K., 4,696,096, Cl. 29-829.000.
van Rassel, William F., to Scientific Atlanta, Inc. Synchronization recovery in a communications system. 4,697,277, Cl. 375-116.000.
Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Pfennings, Leonardus C. M. G.; and Gubbels, Wilhelmus C. H., to U.S. Philips Corporation. Logic boatstrapping circuit having a feedforward kicker circuit. 4,697,111, Cl. 307-482.000.
Vanzetti, Riccardo; and Dostoomian, Ashod S., to Vanzetti Systems, Inc. Method and apparatus for placing and electrically connecting components on a printed circuit board. 4,696,101, Cl. 29-740.000.
Vanzetti, Riccardo; and Dostoomian, Ashod S., to Vanzetti Systems, Inc. Method and apparatus for placing and electrically connecting components on a printed circuit board. 4,696,104, Cl. 29-840.000.
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Varaprath, Sudarsanan, to Dow Corning Corporation. Silicon-containing coatings and a method for their preparation. 4,696,834, Cl. 437-223.000.
Varco International, Inc.: *See*—
Boyadjieff, George I., 4,696,207, Cl. 81-57.340.
Varta Batterie Aktiengesellschaft: *See*—
Glemser, Oskar; Buss, Dieter H.; and Bauer, Jurgen, 4,696,875, Cl. 429-206.000.
VEB "Otto-Buchwitz" Starkstrom-Anlagebau Dresden: *See*—
Bohme, Helmut; Lobl, Helmut; and Grossmann, Steffen, 4,696,531, Cl. 439-851.000.

Veeder Industries Inc.: *See*—
Fleischer, Donald W., 4,697,278, Cl. 377-24.000.

Veendrick, Hendrikus J. M.: *See*—
Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Pfennings, Leonardus C. M. G.; and Gubbels, Wilhelmus C. H., 4,697,111, Cl. 307-482.000.

Vendo Company, The: *See*—
Wilson, Aaron W.; and Pollock, Richard A., 4,696,413, Cl. 221-13.000.

Verdin, Joe L. Light mounting for firearms. 4,697,226, Cl. 362-110.000.

Verheijen, Egidius J. M., to Stamicarbon B.V. Composition of triglycidylisocyanurate with reduced tackiness. 4,696,960, Cl. 524-100.000.

Verhoeven, Laurentius M.; and van Nes, Cornelis G. J., to Du Pont de Nemours, E. I., and Company. Card holder. 4,696,529, Cl. 439-267.000.

Verhoeven, Robertus J. M.: *See*—
Bierhoff, Waltherus C. J.; Schuitmaker, Pieter D.; Ouwerkerk, Cornelis; and Verhoeven, Robertus J. M., 4,696,590, Cl. 400-613.000.

Verhoeven, Thomas R., to Merck & Co., Inc. Preparation of dibenzo[b,f]thiepin compounds. 4,697,037, Cl. 562-432.000.

Verify Electronics Limited: *See*—
Howbrook, Ernest, 4,697,144, Cl. 324-207.000.

Verstraete, Willy; and De Ley, Jozef, to Ateliers de Constructions Electriques de Charleroi (ACEC) Societe Anonyme. Process for the elimination of nitrates by means of a microbiological conversion in the presence of hydrogen gas. 4,696,747, Cl. 210-605.000.

Vetco-Gray Inc.: *See*—
Brammer, Norman, 4,696,493, Cl. 285-3.000.

Vialaron, Andre ; Olalde, Gabriel; and Gauthier, Daniel, to Centre National de la Recherche Scientifique. Process and apparatus for thermolytically dissociating water. 4,696,809, Cl. 423-579.000.

Viator, John R., Sr. Ball actuated alarm device. 4,697,174, Cl. 340-689.000.

Victor Company of Japan, Ltd.: *See*—
Sugiyama, Hiroyuki, 4,697,257, Cl. 369-43.000.

Vidakovits, Lajos J., to Raychem Corp. Heat recoverable termination device. 4,696,841, Cl. 428-36.000.

Vijan, Meera, to Energy Conversion Devices, Inc. Method of forming a large surface area integrated circuit. 4,696,885, Cl. 430-311.000.

Villanyi, Miklos: *See*—
Szody, Peter; Dunajcsik, Peter; Villanyi, Miklos; Bossanszky, Ferenc; Libor, Endre; and Kiss, Ferenc, 4,696,643, Cl. 432-120.000.

Villard, Michel: *See*—
Yves, Henry; Nicollet, Andre; and Villard, Michel, 4,696,094, Cl. 437-23.000.

Viscogliosi, Marcello: *See*—
Schachter, Rozalie; Viscogliosi, Marcello; Bunz, Lewis A.; Olego, Diego J.; Serreze, Harvey B.; and Raccah, Paul M., 4,696,828, Cl. 427-38.000.

Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , to Ceskoslovenska akademie ved. Method and equipment for separation of solids from gaseous mixtures. 4,696,683, Cl. 55-82.000.

Vize, Robert M., to Caterpillar Inc. Vented fuel tank cap assembly. 4,696,409, Cl. 220-203.000.

Voest-Alpine Aktiengesellschaft: *See*—
Enkner, Bernhard; Amon, Leopold; Kubelbock, Alfred; Trimmel, Wolfgang; Nalepka, Paul; Schropp, Leopold; Schwaighofer, Helmut; Pum, Reinhard; Traxler, Manfred; and Tasch, Franz, 4,697,274, Cl. 373-79.000.
Zitz, Alfred; and Maier, Wilfried, 4,696,518, Cl. 299-75.000.

Vomhof, Paul; Schmidt, Karlheinz; and Oster, Peter, to Kramer & Grebe GmbH & Co. KG. Cutter head for meat cutter. 4,696,434, Cl. 241-282.200.

von Berg, Peter, to Peter von Berg Extrakorporale Systems-Medizintechnik GmbH. Flow controller. 4,696,305, Cl. 128-673.000.

Voncken, Wilhelmus G.: *See*—
De Graaff, Hendrik C.; and Voncken, Wilhelmus G., 4,697,199, Cl. 357-23.130.

Vondernau, Werner; Weber, Jurgen; Nickel, Hans; Wissmann, Michael; and Schliemann, Harald, to Stihl, Andreas. Two-stroke engine. 4,696,264, Cl. 123-73.00V.

Vondracek, Petr: *See*—
Sulc, Jiri ; Vondracek, Petr; and Lopour, Petr, 4,696,974, Cl. 525-92.000.

Voorhees, Theodore. Foil applicator. 4,696,714, Cl. 156-468.000.

Vorwerk & Co. Interholding GmbH: *See*—
Ahlf, Heinz-Jurgen; Guhne, Wieland; Simm, Hans-Peter; and Wulf, Peter, 4,696,076, Cl. 15-415.00R.

Vucevic, Svet O., to Marconi International Marine Company Limited. Stabilized platform arrangement. 4,696,196, Cl. 74-5.220.

W & C Pantin Ltd.: *See*—
Avey, Kenneth F. C., 4,696,616, Cl. 414-417.000.

W. S. Tyler, Incorporated: *See*—
Elmquist, Steven A.; and Boesger, Leonard E., 4,696,353, Cl. 175-206.000.

W. Schlafhorst & Co.: *See*—
Hermanns, Ferdinand-Josef, 4,696,435, Cl. 242-18.100.

W. Vinten Limited: *See*—
Russell, Lionel V. F., 4,696,596, Cl. 403-321.000.

Wacom Co., Ltd.: *See*—
Murakami, Azuma; Taguchi, Yoshinori; and Yamanami, Tsuguya, 4,697,244, Cl. 364-520.000.

Wada, Keiichiro: *See*—
Hirai, Hidefumi; Komiyama, Makoto; Hara, Susumu; and Wada, Keiichiro, 4,696,682, Cl. 55-68.000.

Wagemann, Harry, to Blohm & Voss AG. Apparatus for a ship's propeller. 4,696,651, Cl. 440-88.000.

Wagner, Peter, to Geri Engineering GmbH. Steel roadway for magnetic tracks. 4,696,235, Cl. 104-124.000.

Wakai, Katsuro, to Hitachi, Ltd. Scan control apparatus and method for data processing apparatus. 4,697,267, Cl. 371-25.000.

Wakamiya, Masayuki: *See*—
Yamashita, Ichiro; Wakamiya, Masayuki; Hase, Hiroyuki; and Tokuono, Shinya, 4,696,192, Cl. 73-728.000.

Wakatsuki, Kizuku: *See*—
Shiga, Akinobu; Kakugo, Masahiro; Kozima, Junpei; and Wakatsuki, Kizuku, 4,696,979, Cl. 525-247.000.

Wako Pure Chemical Industries, Ltd.: *See*—
Ikenaka, Tokuji; and Omichi, Kaoru, 4,697,006, Cl. 536-17.200.

Walden, Frederick C.: *See*—
Pettit, Harold W., Jr; Davis, Charles G.; and Walden, Frederick C., 4,696,855, Cl. 428-312.800.

Walker, David A.: *See*—
Burnett, William; Houghton, James R.; Walker, David A.; and Key, Larry, 4,696,512, Cl. 297-68.000.

Walker, Don W.; and Rush, Lynn, to Hawkins, Billy J., Sr., a part interest. Pipefitters tape measure. 4,696,110, Cl. 33-137.00R.

Walker, James L.: *See*—
Lunsford, David; and Walker, James L., 4,696,951, Cl. 521-65.000.

Walker, John A.; Witucki, Edward F.; and Warren, Leslie F., to Rockwell International Corporation. Chemical synthesis of conducting polypyrrole. 4,697,001, Cl. 528-423.000.

Wallace, Robert S., to Wallace, Robert S.; and Bauman, Jack, a part interest. Cushioning packaging media. 4,696,401, Cl. 206-594.000.

Walsh, Edward N.: *See*—
Hardy, Thomas A.; and Walsh, Edward N., 4,697,030, Cl. 558-163.000.

Walter, Jean-Jacques; Petit, Daniel; Marzocca, Joseph; Amalric, Jean; and Bernard, Georges, to Gerin, Merlin. Arc extinction device for gas insulation electrical switchgear. 4,697,055, Cl. 200-148.00B.

Wandel u. Goltermann GmbH & Co.: *See*—
Rudolph, Georg, 4,697,156, Cl. 331-1.00A.

Wang, David T. K.; and Wilson, Philip J., to M/A-COM Government Systems, Inc. Linear predictive echo canceller integrated with RELP vocoder. 4,697,261, Cl. 370-32.100.

Ward, Thomas A.; Petracca, Victor G.; and Figore, Timothy, to PPG Industries, Inc. Method of providing structural support for compositions. 4,696,864, Cl. 428-413.000.

Ward, Thomas F.: *See*—
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Yoshino, Ryozo: *See*—
Hirai, Masato; Kurata, Masami; and Yoshino, Ryozo, 4,697,047, Cl. 178-2.00C.

Yoshio, Kazuya: *See*—
Enoki, Shigenaga; Yoshio, Kazuya; and Yamaguchi, Nobuo, 4,696,364, Cl. 180-228.000.

Yoshitake, Makoto; and Kishimoto, Keiichi, to Toray Silicone Co., Ltd. Organopolysiloxane composition for viscous fluid coupling. 4,696,756, Cl. 252-78.300.

Yoshiura, Shoichiro: *See*—
Yamasaki, Kimihito; and Yoshiura, Shoichiro, 4,696,466, Cl. 271-288.000.

Yoshizawa, Mamoru: *See*—
Osawa, Eiichi; Tanaka, Masato; Yoshizawa, Mamoru; Nakai, Jun; and Kojima, Yuichi, 4,697,212, Cl. 360-48.000.

Young, Niels O., to Helix Technology Corporation. Magnetically balanced and centered electromagnetic machine and cryogenic refrigerator employing same. 4,697,113, Cl. 310-15.000.

Young, William P., to William P. Young Co. Container capping apparatus. 4,696,143, Cl. 53-289.000.

Yuhara, Yukitomo: *See*—
Shioi, Yuji; and Yuhara, Yukitomo, 4,696,317, Cl. 132-82.00R.

Yui, Hiroshi: *See*—
Kakizaki, Tetsuji; Mizutani, Toshikazu; and Yui, Hiroshi, 4,696,765, Cl. 252-511.000.

Yves, Henry; Nicollet, Andre; and Villard, Michel, to Thomson - CSF. Process of manufactoring an indium antimonide photodiode. 4,696,094, Cl. 437-23.000.

Zacharin, Alexey T. Scatterable ram air decelerator. 4,696,443, Cl. 244-113.000.

Zambon S.p.A.: *See*—
Giordano, Claudio; Castaldi, Graziano; Uggeri, Fulvio; and Cavicchioli, Silvia, 4,697,036, Cl. 562-418.000.

Zandel, Adam, to Press Technology Corporation. Guiding arrangement for forging press columns assembled of flat tie-rod layers. 4,696,180, Cl. 72-456.000.

Zanussi Elettrodomestici SPA: *See*—
Babuin, Piero, 4,696,171, Cl. 68-207.000.

Zarnstorff, William C.; and Ranallo, Frank N., to Wisconsin Alumni Research Foundation. Method and apparatus for the measurement of X-ray sources. 4,697,280, Cl. 378-207.000.

Zattara, Jean L.: *See*—
Fonfria, Robert; Risbet, Marie P.; and Zattara, Jean L., 4,696,082, Cl. 29-25.420.

Zelinski, Roger M. Portable, collapsible stand for use in cleaning a muzzle loading rifle or a muzzle loading shotgun. 4,696,461, Cl. 269-16.000.

Zeller, Bruno: *See*—
Felten, Klaus; Honroth, Walter; Kuhn, Siegfried; Schulten, Hermann; and Zeller, Bruno, 4,696,209, Cl. 82-40.00R.

Zeller, Zellis C., to Triple "F", Inc. Apparatus for particulating an oleaginous product. 4,696,634, Cl. 425-237.000.

Zemke, Anne H., legal representative: *See*—
Zemke, Edward H., deceased; Vandersyde, Gary L.; Rabindran, K. George; and Guenther, Kenneth L., 4,697,246, Cl. 364-563.000.

Zemke, Edward H., deceased (by Zemke, Anne H., legal representative); Vandersyde, Gary L.; Rabindran, K. George; and Guenther, Kenneth L., to Bell & Howell Company. Method and apparatus for detecting the engagement of a proper number of articles. 4,697,246, Cl. 364-563.000.

Zerrer, Gerhard; and Mayer, Gunter, to Stihl, Andreas. Pruning apparatus. 4,696,108, Cl. 30-276.000.

Zimmermann, Otto. Rotary piston internal combustion engine with water injection. 4,696,268, Cl. 123-203.000.

Zimmermann, Robert W.: *See*—
Harmon, Charles H.; Ward, Thomas F.; and Zimmermann, Robert W., 4,696,402, Cl. 206-602.000.

Zitz, Alfred; and Maier, Wilfried, to Voest-Alpine Aktiengesellschaft. Cutting machine. 4,696,518, Cl. 299-75.000.

Zumbro Enterprises, Inc.: *See*—
Sander, Eugene H.; and Cook, Douglas R., 4,696,762, Cl. 252-311.000.

Zunkel, Richard L. Doorholder assembly for a pocket door. 4,696,500, Cl. 292-251.500.

Zwach, David M. Solar cooker. 4,696,285, Cl. 126-451.000.

Zwirner, Gerhard, to Gebr. Happich GmbH. Swivel bearing for automobile sun visors. 4,696,510, Cl. 296-97.00K.

501 Brunel University: *See*—
Tyman, John H. P., 4,697,038, Cl. 564-265.000.

501 GTE Telecomunicazioni S.p.A.: *See*—
Buoli, Carlo, 4,697,161, Cl. 333-116.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF SEPTEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Engel, Stephen A.; and Fuhrhop, Ronald E., to L-TEC Company. Method and apparatus for making instantaneous scarfing cuts. Re. 32,511, Cl. 148-9.500.

Fuhrhop, Ronald E.: *See*—
Engel, Stephen A.; and Fuhrhop, Ronald E., Re. 32,511, Cl. 148-9.500.

Heggeland, Bruce: *See*—
Tisbo, Cosmo N.; Tisbo, Thomas A.; Recker, Richard D.; and Heggeland, Bruce, Re. 32,510, Cl. 137-355.270.

Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, to Matsushita Electric Industrial Co., Ltd. Method for producing foil electrodes for electrolytic capacitor. Re. 32,512, Cl. 204-58.000.

Kudo, Fumio: *See*—
Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, Re. 32,512, Cl. 204-58.000.

L-TEC Company: *See*—
Engel, Stephen A.; and Fuhrhop, Ronald E., Re. 32,511, Cl. 148-9.500.

Matsushita Electric Industrial Co., Ltd.: *See*—
Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, Re. 32,512, Cl. 204-58.000.

Nakano, Katsutoshi: *See*—
Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, Re. 32,512, Cl. 204-58.000.

Nu Lease Corporation: *See*—
Werner, David G., Re. 32,509, Cl. 52-202.000.

Recker, Richard D.: *See*—
Tisbo, Cosmo N.; Tisbo, Thomas A.; Recker, Richard D.; and Heggeland, Bruce, Re. 32,510, Cl. 137-355.270.

Shimatani, Ryoichi: *See*—
Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, Re. 32,512, Cl. 204-58.000.

Suncast Corporation: *See*—
Tisbo, Cosmo N.; Tisbo, Thomas A.; Recker, Richard D.; and Heggeland, Bruce, Re. 32,510, Cl. 137-355.270.

Tisbo, Cosmo N.; Tisbo, Thomas A.; Recker, Richard D.; and Heggeland, Bruce, to Suncast Corporation. Hose storage apparatus. Re. 32,510, Cl. 137-355.270.

Tisbo, Thomas A.: *See*—
Tisbo, Cosmo N.; Tisbo, Thomas A.; Recker, Richard D.; and Heggeland, Bruce, Re. 32,510, Cl. 137-355.270.

Toyama, Kenji: *See*—
Kanzaki, Nobuyoshi; Toyama, Kenji; Nakano, Katsutoshi; Shimatani, Ryoichi; and Kudo, Fumio, Re. 32,512, Cl. 204-58.000.

Werner, David G., to Nu Lease Corporation. Insulating storm window attachment. Re. 32,509, Cl. 52-202.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Champion International: *See*—
Giblin, John P.; Semancik, Andrew E.; and Forehand, Sherman D., B1 4,575,123, Cl. 281-48.000.

Forehand, Sherman D.: *See*—
Giblin, John P.; Semancik, Andrew E.; and Forehand, Sherman D., B1 4,575,123, Cl. 281-48.000.

Giblin, John P.; Semancik, Andrew E.; and Forehand, Sherman D., to Champion International. Report cover. B1 4,575,123, 9-29-87, Cl. 281-48.000.

Semancik, Andrew E.: *See*—
Giblin, John P.; Semancik, Andrew E.; and Forehand, Sherman D., B1 4,575,123, Cl. 281-48.000.

LIST OF DESIGN PATENTEES

Abbestam, Goran; and Lachonius, Leif, to Aktiebolaget SKF. Chain link. 292,065, 9-29-87, Cl. D8-499.000.

Adams, Steven D.: *See*—
Roden, Mack L.; and Adams, Steven D., 292,124, Cl. D24-16.000.
Roden, Mack L.; and Adams, Steven D., 292,125, Cl. D24-16.000.

Aguirre, Joseph C. Fishing game board. 292,105, 9-29-87, Cl. D21-25.000.

Aiello, Ruby F. Combined I.V. container holding bag and strap. 292,127, 9-29-87, Cl. D24-58.000.

Akita, Tsugio; Uematsu, Toyoyuki; Yamamoto, Masaki; Tsubaki, Hiroyuki; and Kawata, Yoshiaki, to Matsushita Electric Industrial Co. Combined radio and television receiver. 292,097, 9-29-87, Cl. D14-72.000.

Aktiebolaget SKF: *See*—
Abbestam, Goran; and Lachonius, Leif, 292,065, Cl. D8-499.000.

American Bicycle Manufacturing Company: *See*—
Schilplin, Frederick C., 292,074, Cl. D12-111.000.

American Cyanamid Company: *See*—
Keeler, James M.; and Grip, John A., 292,068, Cl. D9-370.000.
Keeler, James M.; and Grip, John A., 292,069, Cl. D9-370.000.

Ampro-Diaclear, Inc.: *See*—
Arp, George F., 292,117, Cl. D23-1.000.

Andersen, Frode. Winch. 292,137, 9-29-87, Cl. D34-33.000.

Armstrong, Jeffrey A.: *See*—
Armstrong, Maclay M.; Houser, Steven A.; and Armstrong, Jeffrey A., 292,123, Cl. D24-10.000.

Armstrong, Maclay M.; Houser, Steven A.; and Armstrong, Jeffrey A., to Unitek Corporation. Orthodontic appliance accessory. 292,123, 9-29-87, Cl. D24-10.000.

Arp, George F., to Ampro-Diaclear, Inc. Support stand for swimming pool filtration units. 292,117, 9-29-87, Cl. D23-1.000.

AVIA Group International, Inc.: *See*—
Tong, James K.; and Kelley, Brenda C., 292,040, Cl. D2-314.000.

Avitare: *See*—
Grube, John W.; and Burridge, Robert E., 292,135, Cl. D34-24.000.

Baptiste, Trevor I. Pair of eye glasses. 292,101, 9-29-87, Cl. D16-104.000.

Beal, James A. Coin roll opener. 292,139, 9-29-87, Cl. D99-14.000.

Beal, John R. Six pack beverage cooler. 292,057, 9-29-87, Cl. D7-77.000.

Bertani, Alberto, to Elesa S.p.A. Combined liquid level guage and thermometer. 292,072, 9-29-87, Cl. D10-53.000.

Billiet, Frank, to Mirodan, Etn. L. D'Haese & Zonen. Wall mirror. 292,043, 9-29-87, Cl. D6-300.000.

Billiet, Frank, to Mirodan, Etn. L. D'Haene & Zonen. Wall mirror. 292,044, 9-29-87, Cl. D6-300.000.

Bitsch, Ullrich H., to Drabert Sohne GmbH & Co. Office chair. 292,047, 9-29-87, Cl. D6-365.000.

Boliek, Lawrence E. Font of type. 292,103, 9-29-87, Cl. D18-27.000.

Bollinger, Howard N.; Cordrey, Robert E.; Ligon, Charles E.; and Myers, David A., to Kenner Parker Toys Inc. Toy vehicle. 292,108, 9-29-87, Cl. D21-137.000.

Brevetti Gaggia S.p.A.: *See—*
Pandolfi, Alberto, 292,098, Cl. D15-82.000.

Bridgestone Corporation: *See—*
Hayakawa, Toshio; and Kobayashi, Tetsuro, 292,080, Cl. D12-146.000.
Hayakawa, Toshio; and Ohkuni, Shinichiro, 292,082, Cl. D12-147.000.

Bryant, Sydney, to Sydney, Bryant Manufacturing Pty. Ltd. Wire tap connector. 292,087, 9-29-87, Cl. D13-24.000.

Burenga, Thomas L., to Worksaver, Inc. Pair of front loader bucket tines. 292,136, 9-29-87, Cl. D34-35.000.

Burridge, Robert E.: *See—*
Grube, John W.; and Burridge, Robert E., 292,135, Cl. D34-24.000.

Carpenter Manufacturing Co.: *See—*
Goldsmith, Arthur; and Carpenter, Thomas, 292,100, Cl. D15-127.000.

Carpenter, Thomas: *See—*
Goldsmith, Arthur; and Carpenter, Thomas, 292,100, Cl. D15-127.000.

Carr, Peter B., to Standard Telephones and Cables, Plc. Portable radio pager. 292,096, 9-29-87, Cl. D14-68.000.

Cesaroni, William C., to Dart Industries Inc. Toaster oven. 292,058, 9-29-87, Cl. D7-350.000.

Clevepak Corporation: *See—*
Nestich, R. Frank, 292,120, Cl. D23-19.000.

Conair Corporation: *See—*
Rittenhouse, James M.; Haber, Barry M.; and Wong, Ting W., 292,092, Cl. D14-62.000.
Rittenhouse, James M.; Haber, Barry M.; and Wong, Ting W., 292,093, Cl. D14-62.000.

Cordrey, Robert E.: *See—*
Bollinger, Howard N.; Cordrey, Robert E.; Ligon, Charles E.; and Myers, David A., 292,108, Cl. D21-137.000.

Dart Industries Inc.: *See—*
Cesaroni, William C., 292,058, Cl. D7-350.000.

Decker, Joseph A., Jr.; Fiore, Joseph F., Jr.; and Katz, Stanley A., to Igloo Corporation. Container having an accessory bag thereon. 292,056, 9-29-87, Cl. D7-77.000.

DiPasquale, Dominic T. Finger ring. 292,073, 9-29-87, Cl. D11-30.000.

Doman, Donald W.; and Mikic, Frank, to Snap-on Tools Corporation. Adjustable wrench. 292,062, 9-29-87, Cl. D8-22.000.

Drabert Sohne GmbH & Co.: *See—*
Bitsch, Ullrich H., 292,047, Cl. D6-365.000.

Elesa S.p.A.: *See—*
Bertani, Alberto, 292,072, Cl. D10-53.000.

Eriksson, Nore, to Telefonaktiebolaget LM Ericsson. Fiber optical distribution box. 292,088, 9-29-87, Cl. D13-40.000.

Fenne, Kenneth R., to Pittway Corporation. Flashlight. 292,131, 9-29-87, Cl. D26-43.000.

Fiore, Joseph F., Jr.: *See—*
Decker, Joseph A., Jr.; Fiore, Joseph F., Jr.; and Katz, Stanley A., 292,056, Cl. D7-77.000.

Funahara, Kiyoshi, to Sumimoto Rubber Industries, Ltd. Motorcycle tire. 292,077, 9-29-87, Cl. D12-140.000.

Gatlin, Charles D., Jr. Tool tray. 292,138, 9-29-87, Cl. D34-45.000.

Germain, Robert A., to USM Corporation. Head for a shovel. 292,061, 9-29-87, Cl. D8-10.000.

Giordano, John M. Chair. 292,050, 9-29-87, Cl. D6-380.000.

Goldman, Paul R., to Plycraft Inc. Chair. 292,049, 9-29-87, Cl. D6-379.000.

Goldsmith, Arthur; and Carpenter, Thomas, to Carpenter Manufacturing Co. Automatic wire cutting machine. 292,100, 9-29-87, Cl. D15-127.000.

Grip, John A.: *See—*
Keeler, James M.; and Grip, John A., 292,068, Cl. D9-370.000.
Keeler, James M.; and Grip, John A., 292,069, Cl. D9-370.000.

Grube, John W.; and Burridge, Robert E., to Avitare. Collapsible cart. 292,135, 9-29-87, Cl. D34-24.000.

Gunlocke Company, The: *See—*
Walker, Kenneth H., 292,046, Cl. D6-370.000.

Haber, Barry M.: *See—*
Rittenhouse, James M.; Haber, Barry M.; and Wong, Ting W., 292,092, Cl. D14-62.000.
Rittenhouse, James M.; Haber, Barry M.; and Wong, Ting W., 292,093, Cl. D14-62.000.

Hatakenaka, Kenji, to Sumitomo Rubber Industries, Ltd. Automobile tire. 292,085, 9-29-87, Cl. D12-147.000.

Hayakawa, Toshio; and Kobayashi, Tetsuro, to Bridgestone Corporation. Automobile tire. 292,080, 9-29-87, Cl. D12-146.000.

Hayakawa, Toshio; and Ohkuni, Shinichiro, to Bridgestone Corporation. Motorcycle tire. 292,082, 9-29-87, Cl. D12-147.000.

Heartland Industries, Inc.: *See—*
Park, Owen H., 292,129, Cl. D25-22.000.

Heitfield, John E. Turf lifting tool or the like. 292,059, 9-29-87, Cl. D8-1.000.

Hertzano, Micha. Playing piece. 292,106, 9-29-87, Cl. D21-51.000.

Hill, Edward H. Combined irrigating and digging tool. 292,118, 9-29-87, Cl. D23-17.000.

Hill, Mark L. Combined automobile door handle and cover plate. 292,063, 9-29-87, Cl. D8-302.000.

Hirota, Taisuke: *See—*
Kubo, Kazuhiko; Tsuda, Masanori; Hirota, Taisuke; Hosoya, Katsuyuki; Torii, Ichirou; and Suzuki, Atsushi, 292,130, Cl. D26-3.000.

Hitachi, Ltd.: *See—*
Kubo, Kazuhiko; Tsuda, Masanori; Hirota, Taisuke; Hosoya, Katsuyuki; Torii, Ichirou; and Suzuki, Atsushi, 292,130, Cl. D26-3.000.

Hosoya, Katsuyuki: *See—*
Kubo, Kazuhiko; Tsuda, Masanori; Hirota, Taisuke; Hosoya, Katsuyuki; Torii, Ichirou; and Suzuki, Atsushi, 292,130, Cl. D26-3.000.

Hostetler, Eldon, to Ziggity Systems, Inc. Gate valve. 292,119, 9-29-87, Cl. D23-19.000.

Houser, Steven A.: *See—*
Armstrong, Maclay M.; Houser, Steven A.; and Armstrong, Jeffrey A., 292,123, Cl. D24-10.000.

Igloo Corporation: *See—*
Decker, Joseph A., Jr.; Fiore, Joseph F., Jr.; and Katz, Stanley A., 292,056, Cl. D7-77.000.

Ikeda, Kazushige, to Sumitomo Rubber Industries, Ltd. Motorcycle tire. 292,079, 9-29-87, Cl. D12-145.000.

Imanishi Kinzoku Kogyo Kasbushiki Kaisha: *See—*
Sakai, Koichi, 292,122, Cl. D23-121.000.

Inoue Attachment Co., Ltd.: *See—*
Inoue, Miyako, 292,126, Cl. D24-19.000.

Inoue, Miyako, to Inoue Attachment Co., Ltd. Tongue press. 292,126, 9-29-87, Cl. D24-19.000.

Kabushiki Kaisha Shinsei Industries: *See—*
Takahashi, Shoji, 292,102, Cl. D18-19.000.

Kabushiki Kaisha Shinwa: *See—*
Ohotani, Chogoroh, 292,067, Cl. D9-332.000.

Kabushiki Kaisha Taito: *See—*
Tamakoshi, Shin, 292,110, Cl. D21-150.000.

Kassamali, Ali; and Kordenbrock, Robert H., to Procter & Gamble Company, The. Bottle. 292,070, 9-29-87, Cl. D9-404.000.

Katz, Stanley A.: *See—*
Decker, Joseph A., Jr.; Fiore, Joseph F., Jr.; and Katz, Stanley A., 292,056, Cl. D7-77.000.

Kawata, Yoshiaki: *See—*
Akita, Tsugio; Uematsu, Toyoyuki; Yamamoto, Masaki; Tsubaki, Hiroyuki; and Kawata, Yoshiaki, 292,097, Cl. D14-72.000.

Keeler, James M.; and Grip, John A., to American Cyanamid Company. Dispensing container for a solid stick product. 292,068, 9-29-87, Cl. D9-370.000.

Keeler, James M.; and Grip, John A., to American Cyanamid Company. Combined dispensing container and cap. 292,069, 9-29-87, Cl. D9-370.000.

Keitoku, Noboru, to Pioneer Electronic Corporation. Speaker. 292,091, 9-29-87, Cl. D14-30.000.

Keller, Fred, Jr. Handle for a writing instrument or the like. 292,104, 9-29-87, Cl. D19-55.000.

Kelley, Brenda C.: *See—*
Tong, James K.; and Kelley, Brenda C., 292,040, Cl. D2-314.000.

Kenner Parker Toys Inc.: *See—*
Bollinger, Howard N.; Cordrey, Robert E.; Ligon, Charles E.; and Myers, David A., 292,108, Cl. D21-137.000.

Kerber, Stanley M. Ground stake. 292,060, 9-29-87, Cl. D8-1.000.

Kijima, Seiichi; and Miura, Yoshihiro, to Masudaya Corporation. Battery operated bird figures toy. 292,111, 9-29-87, Cl. D21-160.000.

Kiyota, Hiroyuki. Bicycle pedal. 292,075, 9-29-87, Cl. D12-125.000.

Kobayashi, Tetsuro: *See—*
Hayakawa, Toshio; and Kobayashi, Tetsuro, 292,080, Cl. D12-146.000.

Kordenbrock, Robert H.: *See—*
Kassamali, Ali; and Kordenbrock, Robert H., 292,070, Cl. D9-404.000.

Kotz, John A.; and Mitchell, Rodney W. Refrigeration gauge manifold bracket. 292,064, 9-29-87, Cl. D8-373.000.

Kubo, Kazuhiko; Tsuda, Masanori; Hirota, Taisuke; Hosoya, Katsuyuki; Torii, Ichirou; and Suzuki, Atsushi, to Hitachi, Ltd. Fluorescent lamp. 292,130, 9-29-87, Cl. D26-3.000.

Kuroda, Yutaka, to Sumitomo Rubber Industries, Ltd. Automobile tire. 292,081, 9-29-87, Cl. D12-146.000.

Lachonius, Leif: *See—*
Abbestam, Goran; and Lachonius, Leif, 292,065, Cl. D8-499.000.

Larson, Lawrence L.: *See—*
Ruger, William B.; and Larson, Lawrence L., 292,112, Cl. D22-104.000.

Lee, Gerald W., to Woodcutters Manufacturing, Inc. Solid fuel burning stove. 292,121, 9-29-87, Cl. D23-97.000.

Lien, Hsu S. Defensive electric prod weapon or similar article. 292,113, 9-29-87, Cl. D22-117.000.

Ligon, Charles E.: *See—*
Bollinger, Howard N.; Cordrey, Robert E.; Ligon, Charles E.; and Myers, David A., 292,108, Cl. D21-137.000.

Lim, Sang-Kwon. Reconfigurable toy vehicle. 292,109, 9-29-87, Cl. D21-150.000.

Lorio, Edward F. Table. 292,052, 9-29-87, Cl. D6-482.000.

Lussier, Marcel, to Markel Industries, Inc. Tacky floor mat. 292,054, 9-29-87, Cl. D6-588.000.

Markel Industries, Inc.: *See—*
Lussier, Marcel, 292,054, Cl. D6-588.000.

Martin, Thomas J., to Tetrad Marketing/Sales Ltd. Modular office work station. 292,051, 9-29-87, Cl. D6-421.000.
Masudaya Corporation: *See—*
Kijima, Seiichi; and Miura, Yoshihiro, 292,111, Cl. D21-160.000.
Matsushita Electric Industrial Co: *See—*
Akita, Tsugio; Uematsu, Toyoyuki; Yamamoto, Masaki; Tsubaki, Hiroyuki; and Kawata, Yoshiaki, 292,097, Cl. D14-72.000.
McDaniel, Walter C., Sr. Sink drainboard. 292,134, 9-29-87, Cl. D32-56.000.
McDowell, Gordon E. Easel design. 292,045, 9-29-87, Cl. D6-311.000.
Mikic, Frank: *See—*
Doman, Donald W.; and Mikic, Frank, 292,062, Cl. D8-22.000.
Mildrum Manufacturing Co.: *See—*
Ziemelis, Herbert, 292,115, Cl. D22-143.000.
Ziemelis, Herbert, 292,116, Cl. D22-143.000.
Miller, John E., Jr., to Woodmaster Tools, Inc. Sanding machine. 292,099, 9-29-87, Cl. D15-124.000.
Mirodan, Etn. L. D'Haene & Zonen: *See—*
Billiet, Frank, 292,043, Cl. D6-300.000.
Billiet, Frank, 292,044, Cl. D6-300.000.
Mitchell, Rodney W.: *See—*
Kotz, John A.; and Mitchell, Rodney W., 292,064, Cl. D8-373.000.
Miura, Yoshihiro: *See—*
Kijima, Seiichi; and Miura, Yoshihiro, 292,111, Cl. D21-160.000.
Monturas y Fornituras, S.A. (MYFSA): *See—*
Rodriguez Gazulla, Francisco, 292,066, Cl. D9-300.000.
Myers, David A.: *See—*
Bollinger, Howard N.; Cordrey, Robert E.; Ligon, Charles E.; and Myers, David A., 292,108, Cl. D71-137.000.
Nestich, R. Frank, to Clevepak Corporation. Combined ball cock and float. 292,120, 9-29-87, Cl. D23-19.000.
Ohkuni, Shinichiro: *See—*
Hayakawa, Toshio; and Ohkuni, Shinichiro, 292,082, Cl. D12-147.000.
Ohotani, Chogoroh, to Kabushiki Kaisha Shinwa. Carton. 292,067, 9-29-87, Cl. D9-332.000.
Ozawa, Mitsuo, to Sumitomo Rubber Industries, Ltd. Automobile tire. 292,083, 9-29-87, Cl. D12-147.000.
Pandolfi, Alberto, to Brevetti Gaggia S.p.A. Ice cream maker. 292,098, 9-29-87, Cl. D15-82.000.
Park, Owen H., to Heartland Industries, Inc. Building or similar article. 292,129, 9-29-87, Cl. D25-22.000.
Pensa, Inc.: *See—*
Tong, James K., 292,041, Cl. D2-320.000.
Peters, Gilbert E., to Theraped, Inc. Walker. 292,076, 9-29-87, Cl. D12-130.000.
Pioneer Electronic Corporation: *See—*
Keitoku, Noboru, 292,091, Cl. D14-30.000.
Pittway Corporation: *See—*
Fenne, Kenneth R., 292,131, Cl. D26-43.000.
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NOTE.—First number, class; second number, subclass; third number, patent number

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53 B 4,696,442
113 4,696,443
127 4,696,444
229 4,696,445

CLASS 246

169 S 4,696,446

CLASS 248

206.3 4,696,447
311.2 4,696,448
553 4,696,449
661 4,696,450

CLASS 249

16 4,696,451

CLASS 250

211 R 4,697,074
213 VT 4,697,075
223 B 4,697,076
231 SE 4,697,077
256 4,697,078
303 4,697,079
307 4,697,080
338 4,697,081
341 4,697,082
374 4,697,083
376 4,697,084
426 4,697,085
492.2 4,697,086
548 4,697,087
561 4,697,088
4,697,089

CLASS 251

25 4,696,452
149.6 4,696,453
321 4,696,454

CLASS 252

8.553 4,696,752
26 4,696,753
40.5 4,696,754
62.54 4,696,725
78.3 4,696,756
186.29 4,696,757
188.31 4,696,758
299.62 4,696,759
311 4,696,762
314 4,696,760
358 4,696,761
391 4,696,763
503 4,696,764
511 4,696,765
515 R 4,696,755
557 4,696,767
628 4,696,768
638 4,696,769
700 4,696,770

CLASS 260

404 4,696,771
502.5 F 4,696,772
513 R 4,696,773
543 R 4,696,774

CLASS 261

1 4,696,775

CLASS 264

46.4 4,696,776
60 4,696,777
65 4,696,778
211.13 4,696,779
222 4,696,780

CLASS 266

44 4,696,455
4,696,456
207 4,696,457
212 4,696,458

CLASS 267

36.1 4,696,459

CLASS 269

6 4,696,460
16 4,696,461

CLASS 271

10 4,696,462
176 4,696,463
202 4,696,464
237 4,696,465
288 4,696,466

CLASS 272

114 4,696,467
124 4,696,468
134 4,696,469
144 4,696,470

CLASS 273

29 A 4,696,471
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176 A 4,696,474
227 4,696,475
241 4,696,476
4,696,477
261 4,696,478

CLASS 277

37 4,696,479
53 4,696,480
80 4,696,481

CLASS 279

1 SJ 4,696,482
121 4,696,513

CLASS 280

6 H 4,696,483
43.16 4,696,484
221 4,696,485
400 4,696,486
602 4,696,487
690 4,696,488
707 4,696,489

CLASS 281

15 R 4,696,490
48 B1 4,575,123

CLASS 283

37 4,696,491
45 4,696,492

CLASS 285

3 4,696,493
18 4,696,494
86 4,696,495
137.1 4,696,496
234.4 4,696,499
307 4,696,497
334 4,696,498

CLASS 290

4 R 4,697,090
45 4,697,091

CLASS 292

251.5 4,696,500

CLASS 294

86.17 4,696,502
86.4 4,696,501
88 4,696,503
148 4,696,504
153 4,696,505

CLASS 295

38 4,696,506

CLASS 296

37.6 4,696,507
65 R 4,696,508
84 A 4,696,509
97 K 4,696,510
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CLASS 297

68 4,696,512
284 4,696,514
374 4,696,515
458 4,696,516

CLASS 298

1 T 4,696,517

CLASS 299

75 4,696,518

CLASS 300

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CLASS 301

63 DS 4,696,520

CLASS 303

92 4,696,521

CLASS 307

10 R 4,697,092
38 4,697,093
40 4,697,094
243 4,697,095
246 4,697,096
296 R 4,697,097
354 4,697,098
355 4,697,099
427 4,697,100
452 4,697,101
454 4,697,102
456 4,697,103
463 4,697,104
4,697,106
465 4,697,105
474 4,697,107
475 4,697,108
4,697,109
4,697,110
482 4,697,111
530 4,697,112

CLASS 310

15 4,697,113
156 4,697,114
313 R 4,697,115
322 4,697,116
323 4,697,117
331 4,697,118

CLASS 312

297 4,696,522

CLASS 313

408 4,697,119
412 4,697,120
595 4,697,121

CLASS 315

158 4,697,122
169.4 4,697,123

CLASS 318

63 4,697,124
254 4,697,125
331 4,697,126
561 4,697,127
607 4,697,128
696 4,697,129
760 4,697,130
762 4,697,131
795 4,697,132

CLASS 320

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CLASS 322

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CLASS 324

73 R 4,697,138
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207 4,697,144
244 4,697,145
4,697,146
306 4,697,147
309 4,697,148
4,697,149
373 4,697,150
512 4,697,137

CLASS 330

2 4,697,151
9 4,697,152
277 4,697,153
4,697,154
297 4,697,155

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1 A 4,697,156
78 4,697,157

CLASS 333

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24 C 4,697,159
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161 4,697,162

CLASS 335

174 4,697,163
253 4,697,164

CLASS 338

34 4,697,165

CLASS 340

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347 DD 4,697,167
347 P 4,697,168
540 4,697,169
543 4,697,171
551 4,697,170
587 4,697,172
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707 4,697,175
723 4,697,176
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729 4,697,178
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870.25 4,697,183

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185 4,697,185
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CLASS 343

700 MS 4,697,189
719 4,697,190
809 4,697,191
895 4,697,192

CLASS 346

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159 4,697,196

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96.15 4,696,534
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96.20 4,696,537
4,696,538
96.21 4,696,539
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96.23 4,696,541
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4,696,543
96.26 4,696,544
167 4,696,545
235 4,696,546
255 4,696,566
319 4,696,547
338 4,696,548
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427 4,696,553
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634 4,696,555

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CLASS 353

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CLASS 354

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439 4,696,560

CLASS 355

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8 4,696,563
14 R 4,696,564
15 4,696,565

CLASS 356

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28.5 4,696,568
124 4,696,569
319 4,696,570
336 4,696,571
348 4,696,572
353 4,696,573
375 4,696,574

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24 4,697,200
41 4,697,201
63 4,697,202
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74 4,697,204
82 4,697,205

CLASS 358

14 4,697,206
17 4,697,207
44 4,697,208
84 4,697,209
98 4,697,210
153 4,697,211

CLASS 360

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78 4,697,213
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93 4,697,219
100 4,697,220
156 4,697,221
321 4,697,222
393 4,697,223
433 4,697,224

CLASS 362

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110 4,697,226
233 4,697,227
352 4,697,228

CLASS 363

49 4,697,229
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CLASS 364

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200 4,697,232
4,697,233
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754 4,697,248
900 4,697,249
4,697,250

CLASS 365

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189 4,697,252

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80 4,696,575

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146 4,697,255

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CLASS 370

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85 4,697,263
111 4,697,264

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5 4,697,265
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67 4,697,268

CLASS 372

34 4,697,269
4,697,270
68 4,697,271
99 4,697,272

CLASS 373

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79 4,697,274

CLASS 374

45 4,696,578
162 4,696,580
187 4,696,579

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116 4,697,277

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159 4,696,782
228 4,696,783
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4,696,785
4,696,786
247 4,696,787
253 4,696,788
254 4,696,789
296 4,696,790
299 4,696,791
377 4,696,792
447 4,696,793

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24 4,697,278
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CLASS 378

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CLASS 379

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67 4,697,282
443 4,697,283

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107 4,696,584
399 4,696,585
500 4,696,586
536 4,696,587
565 4,696,581
615 4,696,588

CLASS 400

119 4,696,589
613 4,696,590
613.2 4,696,591
636 4,696,592

CLASS 401

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CLASS 402

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CLASS 403

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202 4,696,601
205 4,696,602
227 4,696,603
4,696,604
251 4,696,605
259 4,696,606
267 4,696,607

CLASS 406

155 4,696,608

CLASS 410

69 4,696,609

CLASS 411

38 4,696,610
103 4,696,611

CLASS 414

8 4,696,612
11 4,696,613
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417 4,696,616
422 4,696,617

CLASS 415

119 4,696,618
138 4,696,619
164 4,696,620
191 4,696,621
211 4,696,622

CLASS 416

230 4,696,623

CLASS 417

56 4,696,624
174 4,696,625
312 4,696,626

CLASS 418

15 4,696,627
4,696,628
55 4,696,629
4,696,630

CLASS 422

56 4,696,795
88 4,696,796
101 4,696,797
102 4,696,798
148 4,696,799
186.18 4,696,800

CLASS 423

24 4,696,801
226 4,696,802
228 4,696,803
242 4,696,804
4,696,805
248 4,696,806
305 4,696,807
338 4,696,808
579 4,696,809
593 4,696,810

CLASS 424

53 4,696,811
59 4,696,813
80 4,696,814
4,696,815
94 4,696,816
118 4,696,794
123 4,696,817
195.1 4,696,818
4,696,819
445 4,696,812
448 4,696,821
490 4,696,822

CLASS 425

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150 4,696,632
192 S 4,696,633
237 4,696,634
330 4,696,635
526 4,696,636
589 4,696,637

CLASS 426

102 4,696,824
283 4,696,825
496 4,696,823
565 4,696,826

CLASS 427

36 4,696,827
38 4,696,828
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41 4,696,830
48 4,696,831
58 4,696,832
121 4,696,835
208.4 4,696,836
255.3 4,696,837
407.2 4,696,838

CLASS 428

15 4,696,839
36 4,696,841
40 4,696,842
41 4,696,843
46 4,696,844
64 4,696,845
65 4,696,846
76 4,696,847
80 4,696,848
95 4,696,849
197 4,696,850
210 4,696,851
222 4,696,852
257 4,696,853
287 4,696,854
312.8 4,696,855
321.5 4,696,856
323 4,696,857
4,696,858
4,696,859
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328 4,696,861
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402.2 4,696,863
413 4,696,864
474.4 4,696,865
614 4,696,866
650 4,696,867
690 4,696,868
695 4,696,869

CLASS 429

14 4,696,870
17 4,696,871
42 4,696,872
59 4,696,873
64 4,696,874
206 4,696,875

CLASS 430

1 4,696,876
5 4,696,877
4,696,878
24 4,696,879
42 4,696,880
57 4,696,881
4,696,882
4,696,883
58 4,696,884
192 4,696,886
203 4,696,887
270 4,696,888
271 4,696,820
311 4,696,885
4,696,889
325 4,696,890
4,696,891
495 4,696,892
543 4,696,893
551 4,696,894

CLASS 431

4 4,696,638
59 4,696,639
289 4,696,640
362 4,696,641

CLASS 432

59 4,696,642
120 4,696,643

CLASS 433

88 4,696,644
125 4,696,645
149 4,696,646

CLASS 434

224 4,696,647

CLASS 435

7 4,696,895
4,696,896
42 4,696,897
68 4,696,898
4,696,899
104 4,696,900
180 4,696,901
300 4,696,902

CLASS 436

28 4,696,903
39 4,696,904
64 4,696,905
78 4,696,906
513 4,696,907

CLASS 437

5 4,696,092
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88 4,696,702
176 4,696,093
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193 4,696,097
223 4,696,834
225 4,696,833

CLASS 439

11 4,696,523
53 4,696,527
68 4,696,526
69 4,696,525
98 4,696,649
4,696,908
160 4,696,528
197 4,696,524
266 4,696,530
267 4,696,529
851 4,696,531
863 4,696,532

CLASS 440

49 4,696,650
88 4,696,651

CLASS 446

75 4,696,652
175 4,696,653
268 4,696,654
330 4,696,655
376 4,696,656

CLASS 455

619 4,697,284

CLASS 464

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112 4,696,658
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170 4,696,660

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138 4,696,664
153 4,696,665

CLASS 494

16 4,696,666

CLASS 501

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15 4,696,913
19 4,696,914
21 4,696,915
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54 4,696,917
58 4,696,918
62 4,696,919
89 4,696,920
157 4,696,921
185 4,696,922
210 4,696,923
211 4,696,924
219 4,696,925
230 4,696,926
236 4,696,927
250 4,696,928
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256 4,696,930
261 4,696,931
263 4,696,932
275 4,696,933
277 4,696,934
297 4,696,935
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314 4,696,937
343 4,696,938
361 4,696,939
400 4,696,940
423 4,696,941
424 4,696,942
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450 4,696,945
478 4,696,947
531 4,696,944
574 4,696,946
605 4,696,948
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CLASS 521

57 4,696,950
65 4,696,951
107 4,696,952
146 4,696,953
167 4,696,954

CLASS 522

77 4,696,955

CLASS 523

137 4,696,956
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CLASS 524

21 4,696,958
91 4,696,959
100 4,696,960
4,696,961
140 4,696,962
144 4,696,963
236 4,696,964
380 4,696,965
412 4,696,966
437 4,696,967
610 4,696,968
762 4,696,969
860 4,696,970

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67 4,696,972
71 4,696,973
92 4,696,974
113 4,696,975
126 4,696,976
184 4,696,977
205 4,696,978
247 4,696,979
326.1 4,696,980
328.2 4,696,981
507 4,696,982

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62 4,696,983
98 4,696,984
119 4,696,985
181 4,696,986
216 4,696,987
220 4,696,988
254 4,696,989
304 4,696,990

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45 4,696,991
90 4,696,992
167 4,696,993
176 4,696,994
206 4,696,995
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272 4,696,998
319 4,696,999
423 4,697,000
4,697,001

CLASS 530

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380 4,697,003

CLASS 536

6.4 4,697,005
17.2 4,697,006
83 4,697,007
89 4,697,008

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487 4,697,009
536 4,697,010
544 4,697,011

CLASS 544

124 4,697,012
183 4,697,013
193 4,697,014
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344 4,697,016
346 4,697,017

CLASS 546

94 4,697,018
112 4,697,019
288 4,697,021

CLASS 548

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444 4,697,022

CLASS 549

241 4,697,023
444 4,697,024

CLASS 556

183 4,697,025
418 4,697,026
466 4,697,027

CLASS 558

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163 4,697,030
169 4,697,031
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270 4,697,032
274 4,697,034
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CLASS 562

418 4,697,036
432 4,697,037

CLASS 564

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CLASS 585

477 4,697,039
666 4,697,040

CLASS 604

22 4,696,667
28 4,696,668
34 4,696,669
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67 4,696,671
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	320	292,041		350	292,058		125	292,075		62	292,092		150	292,109			292,125
D3—	10	292,042	D8—	1	292,059		130	292,076			292,093			292,110		19	292,126
D6—	300	292,043			292,060		140	292,077		64	292,094		160	292,111		58	292,127
		292,044		10	292,061		141	292,078			292,095	D22—	104	292,112		64	292,128
	311	292,045		22	292,062		145	292,079		68	292,096		117	292,113	D25—	22	292,129
	363	292,048		302	292,063		146	292,080		72	292,097		129	292,114	D26—	3	292,130
	365	292,047		373	292,064			292,081	D15—	87	292,098		143	292,115		43	292,131
	370	292,046		499	292,065		147	292,082		124	292,099			292,116	D27—	42	292,132
	379	292,049	D9—	300	292,066			292,083		127	292,100	D23—	1	292,117	D32—	1	292,133
	380	292,050		332	292,067			292,084	D16—	104	292,101		17	292,118		56	292,134
	421	292,051		370	292,068			292,085	D18—	19	292,102		19	292,119	D34—	24	292,135
	482	292,052			292,069			292,086		27	292,103			292,120		33	292,137
	514	292,053		404	292,070	D13—	24	292,087	D19—	55	292,104		97	292,121		35	292,136
	588	292,054		442	292,071		40	292,088	D21—	25	292,105		121	292,122		45	292,138
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	77	292,056	D11—	30	292,073	D14—	4	292,090		59	292,107	D24—	10	292,123	D99—	34	292,139

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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DESIGN PATENTS

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